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THE IMPORTANCE OF REST AND LIVER THERAPY IN THE TREATMENT OF SUBACUTE COMBINED DEGENERATION OF THE CORD*

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THE efficacy of liver and potent preparations in the prompt relief of the anæmia of Addison's pernicious anæmia is generally recognized. There is, however, a great difference of opinion about the effect on the neurological manifestations of the disease. In 1927, Minot and Murphy[1] reported that liver therapy prevented the development and arrested the progress of neurological symptoms and in cases of short duration gave rise to definite improvement. Two years later Ungley and Suzman[2] described striking improvement in a group of cases of subacute combined degeneration of the cord that received "adequate" liver therapy. In 1930 Farquharson and Graham[3] reported similar good results, finding complete arrest of the progress of neurological manifestations in all those who took the prescribed amount of liver, and great improvement in the nervous symptoms of the disease, especially when these had been of short duration. Like Baker, Bordley and Longcope,[4] they emphasized the importance of large dosage of liver in patients with involvement of the spinal cord. Very recently, Strauss, Solomon, Schneider and Patek[5] have stated that the disease is completely arrested in patients receiving parenteral liver therapy in sufficient amounts. During this time (since 1927) many authors have described improvement in isolated or small groups of cases or noted lack of development or progression of subacute combined degeneration in patients under adequate liver therapy. In the same period, however, numerous other writers have described the development and progression of neurological symptoms in cases said to be receiving specific therapy in adequate amounts. A number of these have found improvement in some instances, arrest of the process in others, but definite progression of the disease in quite a proportion of their cases. Some have even stated that liver therapy had no influence whatsoever on the neurological phenomena. In reporting the largest series of this group, Goldhamer, Bethell, Isaacs and Sturgis[6] concluded that, regardless of the type of adequate anti-anæmia therapy, improvement in symptoms referable to the central nervous system was observed in less than 50 per cent of the cases and improvement in the signs in about 2 per cent. They found that nervous signs appeared or became worse in many patients "receiving adequate treatment", and they believe that anti-anæmic therapy has no specific curative effect on the spinal cord degeneration, but contributes only indirectly to the improvement in the neurological symptoms.

The results obtained since 1930 at the Toronto General Hospital fully confirm our earlier optimistic report.[3] Progress of the degenerative lesion of the cord has been completely arrested in all patients who followed the prescribed treatment. Marked improvement, no matter how severe the lesion, occurred in those whose symptoms and signs were of short duration. Many with neurological disability for one to two years improved definitely. But most of those whose symptoms and signs were of long duration and great severity remained permanent invalids. We are satisfied that in many cases there is

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actual improvement in the functional state of the spinal cord quite apart from the very great benefit derived from the relief of the anæmia and other manifestations of the disease.

The purpose of this paper is to emphasize the importance of the continued administration of large amounts of potent liver preparations, *i.e.*, adequate liver therapy, and of prolonged rest in bed in the treatment of patients suffering from pernicious anæmia with subacute combined degeneration of the spinal cord. A summary of the results obtained at the Toronto General Hospital, reported in greater detail elsewhere,[8] will be given. The influence of other factors, such as, the presence of complications, the rôle of physical therapy and re-educational measures, the effect of relief of the anæmia and other manifestations of the disease on the neurological symptoms, and the importance of the location, extent and duration of the neurological lesion, will be considered.

Adequate Liver Therapy

Most writers, whether reporting beneficial effects or progression of the neurological lesion, affirm that the patients have received adequate therapy. In many cases the amount actually received by the patient is not stated. Also, the presence or absence of anæmia is commonly considered as the only measure of adequacy. Now, as previously emphasized,[3] there is no reason for assuming that the amount of active principle adequate or optimal for the control of the anæmia would always be equally satisfactory in the treatment of spinal cord lesions. It is well known that severe anæmia may develop in the absence of gross neurological manifestations, and it is common experience to find patients suffering from far advanced subacute combined degeneration of the cord in whom there is not and never has been any appreciable reduction in the blood hæmoglobin. Similar observations are to be made with regard to other manifestations of the disease, such as glossitis and gastro-intestinal symptoms. Not infrequently is it found that a certain amount of "liver" has been sufficient to effect complete relief in so far as one such manifestation of the disease is concerned, while being definitely inadequate for another.

There is, moreover, considerable variation in the actual amounts of "liver" necessary to maintain a normal blood picture in different people. Some patients will go for long intervals in a spontaneous remission, requiring little or no liver; others, even in the absence of any obvious complication or infection, will require much more than the amount usually found adequate. Not infrequently, even when the hæmoglobin is maintained at or above 80 per cent and the red blood count about 4,000,000, increased numbers of large red blood cells, often polychromatic, will be found in the blood film. Such patients are sometimes considered to be adequately treated, although from the hæmatological point of view they present the earliest manifestations of the disease. Frequently they complain of weakness and fatigue, symptoms that are relieved when they are given larger amounts of potent liver preparations. In several such patients development or progression of symptoms of subacute combined degeneration of the cord has been observed in the clinic at the Toronto General Hospital. Surely adequate liver therapy in the treatment of pernicious anæmia consists in the administration of that amount of active principle necessary to relieve all the manifestations of the disease. From the point of view of the neurological lesions the amount must be sufficient completely to prevent progression of the degenerative process and to further to the utmost the return of surviving but damaged nerve fibres to normal function. It is obvious that this will be facilitated by the improvement in strength and sense of well-being that follows upon relief of other manifestations of the disease.

It is relatively easy to determine whether a patient is receiving sufficient treatment to relieve the anæmia and to maintain normal blood formation, for the yardstick is easy to use and the early changes resulting from insufficiency are fairly characteristic. Moreover, the response to treatment is prompt when sufficient potent material is administered and the hæmoglobin rises to a normal level in a few weeks.

With regard to the changes in the central nervous system, the situation is very different. The disease may appear insidiously and progress slowly, or the onset may be rapid, severe symptoms and signs appearing within a few weeks. In either case it is probable that considerable degeneration in the fibre tracts has occurred before manifestations of the disease are definite. Furthermore, the symptoms are not relieved immediately after the institution of satisfactory therapy, but, as in all neurological lesions in

which improvement is known to occur, improvement is considerably delayed.

Since it is not possible to determine at once the smallest dose of potent preparations necessary to maintain the patient in good health, free from all manifestations of pernicious anæmia, and, most important, to prevent the development of neurological lesions, it has been the custom at the Toronto General Hospital to recommend as the maintenance dosage approximately the same amounts of potent material as are used in the initial treatment of patients with anæmia, namely, the daily ingestion of one-half pound* of cooked liver, or broth or extract derived from one pound (500 g.) liver, or 20 to 30 g. of ventriculin; or the intramuscular administration of the extract derived from 100 g. of liver once a week or once in two weeks. We fully realize that many patients would continue to feel well for long periods and perhaps indefinitely when given smaller amounts, but we have felt that it was wiser to run no risk of development of neurological lesions and have held to the larger doses. Should any symptoms suggestive of neurological degeneration or other manifestations of the disease appear, the dosage is at once increased. Should there be any suspicion that the patient is not taking the amount advised, intramuscular therapy is instituted without delay.

Patients suffering from pernicious anæmia with definite subacute combined degeneration of the spinal cord, not merely paraesthesia but gross symptoms and signs of involvement of the fibre tracts, are given at least 50 per cent more, and usually two or three times as much of the potent material as in the case of patients without neurological disease. In the last three years liver extract has been administered intramuscularly whenever possible, because large amounts of potent material can be given so easily in this way, and one can be sure that the patient actually receives the treatment prescribed.† Accordingly, all patients suffering from definite subacute combined degeneration are now given the extract from 200 g. of liver intramuscularly every week. In certain instances considerably larger doses have been administered.

On such specific therapy some patients whose neurological symptoms have been of short duration showed early improvement. In the majority of cases, however, maximal recovery occurred after the third month and commonly between the third and sixth month. In a few instances improvement began as long as six to eight months after the institution of therapy. It is important, therefore, to observe each patient for a long time before passing judgment on the efficacy of the liver therapy. It is important also to continue the administration of large amounts of potent material for some months after improvement has ceased to occur. Then the dose may be reduced to some extent. It is wiser, however, to continue to give each patient larger amounts than would usually be used in the initial treatment of patients suffering from anæmia alone. Moreover, the slightest symptom or sign suggestive of further degeneration should be an indication for resumption of the larger dosage.

THE IMPORTANCE OF REST

The therapeutic value of rest in diseases of all systems is generally recognized. However, in certain slowly progressive neurological disorders the importance of exercising affected limbs, to prevent a more complete loss of function through want of use, has often been urged. Some physicians accordingly have been afraid to treat patients suffering from severe subacute combined degeneration of the cord with complete rest for prolonged periods. When, however, nervous tissue has been damaged by a toxic or inflammatory agent rest for long periods is usually advised. Thus in the early treatment of acute anterior poliomyelitis complete rest in bed is considered of great importance, and during the period of prolonged rest marked improvement in function is frequently observed. Acting on the belief that the degenerative process in the spinal cord could be arrested and that some of the damaged fibres not yet destroyed might regain their function, our patients suffering from pernicious anæmia with severe neurological symptoms are kept at complete rest in bed for at least three months, during which

* Occasionally patients have been advised to take one-third of a pound of liver daily as a maintenance dose.

† Since it is important to be sure that the preparation used is potent, and because there is considerable variation in potency of various available preparations, the same preparation has been used throughout, namely, that prepared by the Connaught Laboratories of the University of Toronto and generously supplied to us for this work. This extract is supplied in 10 c.c. vials, each containing the extract derived from 100 g. of liver. It is known[7] that this extract given intramuscularly is at least more than thirty times as effective as when given by mouth.

time large doses of potent liver preparations are administered. The results, we believe, fully warrant this method. In no case has the functional disability increased; frequently signs of neurological disease have become less marked during this period; in many instances, within a few days of getting up, and without any re-educational measures or physical therapy, the patient has been able to walk much better than was possible at the beginning of treatment. This is true of those that suffered from severe cord disease without anæmia, as well as of those in whom considerable improvement might be expected to occur following upon an increase in the hæmoglobin level. Furthermore, it has been observed that the neurological signs and symptoms are aggravated by excessive exercise and fatigue. Accordingly, activity should be increased very gradually, always short of great fatigue.

THE MANAGEMENT OF PATIENTS

During the first four years of liver therapy (1926-1930) our patients with pernicious anæmia received daily one-third to one-half pound of whole liver or broth, made according to definite directions[3] from 500 g. of liver. Patients suffering from neurological manifestations of the disease were usually given somewhat larger dosage and great stress was placed upon the importance of continuing to take the prescribed amounts after discharge from hospital. It so happened that the patients who took the largest amounts of liver (and some of them had taken considerably more than was prescribed) showed the greatest improvement. It seemed also that improvement was facilitated by a prolonged period of rest. Gradually, therefore, the dose of liver was increased and the initial period of rest prolonged. Most patients would not eat more than one-half pound of whole liver per day, and many tired of it, so that we were often doubtful whether they took as much as they claimed to take. The great majority, however, would continue to take daily the broth made from 1,000 g. of liver (an amount approximately equivalent in potency to 500 g. of whole liver). The results obtained from this, continued during an initial period of three months' complete rest and afterwards, were gratifying in all patients whose neurological disease had not been of long duration. The one great difficulty was in making sure that the patient continued to take the amounts of liver extract or broth prescribed. To overcome this uncertainty, patients with severe degeneration of the cord were kept in hospital for four to twelve months, during which time suitable preparations were given in the desired quantity.

In addition to rest and liver therapy care was taken in the treatment of the patient as an individual. Rest was facilitated by explanation, encouragement and, in the initial stages, by the use of appropriate sedatives. Complicating conditions were relieved whenever possible. Every precaution was taken to prevent pressure sores and urinary infections, and when these were present appropriate treatment was carefully given. In a few cases with extremely severe disease contractures of the legs had developed. These were relieved by a series of plaster casts and by passive movement. Massage and passive movements were freely used, except where purposely omitted in an attempt to determine their value.

Since 1930 all the neurological examinations were made and recorded by Dr. Hyland. Complete examination was repeated every two to three weeks during the initial months of treatment and at increasingly longer intervals thereafter. The diagnosis of subacute combined degeneration of the spinal cord was made on the presence of definite symptoms associated with signs of disease of the posterior and lateral columns, such as, definite alteration in gait with spasticity, ataxia, or both; absence of tendon reflexes; definite changes in sensation; loss of sphincter control persisting after recovery from anæmia; and the presence of extensor responses. Paraesthesiæ, complained of by the great majority of patients suffering from pernicious anæmia, and such minor changes as loss vibration sense or absence of ankle jerks, without more extensive signs and symptoms, were not considered as evidence of subacute combined degeneration of the cord. As explained elsewhere,[8] there were good reasons for the belief that the neurological symptoms were not due to involvement of the peripheral nerves.

THE RESULTS OF TREATMENT

Of 172 cases of pernicious anæmia admitted to the wards of the Toronto General Hospital between June, 1926, and June, 1933, seventy-four presented symptoms and signs of subacute combined degeneration of the spinal cord. This

number includes 62 cases that presented manifestations of cord disease on first admission to our hospital and 12 cases in whom the disease developed following the first term of treatment.

The development of neurological symptoms under inadequate liver therapy

It is noteworthy that every one of these 12 patients had ceased to take liver, or failed to take the prescribed amount, for some time before development of the neurological symptoms that led to subsequent readmission. In most of these cases a definite change in the blood picture was associated; in some, a severe anæmia with typical changes in the blood film; in others the anæmia was slight, although macrocytosis was present. In one instance, however, serious neurological symptoms appeared in an elderly woman whose blood picture had not become characteristic of pernicious anæmia. For five years she had eaten one-quarter pound of liver five or six days per week, remaining well and refusing to take more. Then, over a period of a few weeks, stiffness and weakness of the legs progressed rapidly till she was unable to walk alone. On admission, her hæmoglobin was 92 per cent, red blood count 4,400,000, and the blood film showed no macrocytosis. There were gross signs of pyramidal tract disease, with less marked involvement of the posterior columns and a certain amount of mental change. She was kept in bed for three months and given each day one-third of a pound of cooked liver in addition to the broth made from 1,000 g. of liver. Beginning in the third month of treatment great improvement occurred. On discharge, after five months in hospital, she could walk alone without difficulty. At present she is almost symptom-free although there are still signs, less marked than formerly, of the neurological disease.

Improvement during prolonged rest in hospital

A summary of the results of treatment of the 74 cases of subacute combined degeneration of the cord during their first prolonged stay in hospital for treatment of the neurological disease (usually 4 to 12 months) is given in Table I. It is readily seen that when the symptoms of subacute combined degeneration of the cord were mild, usually being of short duration, the results were excellent; with increasing severity of the neurological symptoms the results were progressively worse. Among those with severe disease, however, 8 showed striking improvement. In 7 of these the severe symptoms were of less than one year's duration, and usually they had been present for only a few months.

TABLE I.

RELATION OF DEGREE OF IMPROVEMENT TO THE INITIAL SEVERITY OF THE LESION

Improvement during initial prolonged hospital treatment	*Severity of symptoms of spinal cord disease*		
	Mild	*Moderate*	*Severe*
MARKED: (Almost symptom free—definite improvement in signs)...	18	15	8
MODERATE: (Definite relief in symptoms—little change in signs)	5	7	4
SLIGHT and STATIONARY: (Little improvement but no progression)	2	3	4
*Died shortly after admission:	0	3	5

*One of these patients lived for several weeks after admission and died of subacute combined degeneration of the cord, with infection of the urinary tract and bedsores.

The eighth patient, a woman of fifty-two, had suffered from gradual progression of the neurological lesion with increasing anæmia over a period of two years prior to admission to hospital. After eight months' treatment in hospital, receiving broth from 500 g. of liver, in addition to one-third of a pound of cooked liver daily, she was still incapacitated by the neurological symptoms, although her general condition had been good for months. Accordingly, she was transferred to the Hospital for Incurables, where the same treatment was continued. In the next twelve months there was remarkable improvement. The impaired superficial sensation and sense of position became virtually normal; vibration sense in the feet returned; spasticity and ataxia almost disappeared. She was discharged from the Hospital for Incurables and now walks to the hospital for liver therapy regularly, no abnormality being apparent in her gait. Vibration sense, though present, is still impaired; ankle jerks have returned; plantar responses are still extensor.

The most striking improvement noted in the series occurred in a patient of thirty-nine years.

He had been treated for pernicious anæmia in this hospital on a previous occasion. Seen again in September, 1932, he was entirely free from neurological manifestations; the hæmoglobin was 98 per cent; the red blood count 4,300,000; a few macrocytes were present. He was taking broth from one-half pound of liver daily, and was advised to increase the dose, but failed to do so. In December of the same year he was readmitted, completely unable to walk without support because of neurological symptoms that began four weeks previously. His legs were weak and spastic; bilateral ankle clonus and typical Babinski phenomena were present; sense of position of feet and legs was grossly impaired; and vibration was not appreciated at the ankles. His hæmoglobin was 62 per cent; red blood count 2,600,000; the blood film was characteristic of pernicious anæmia. Over a period of three months' rest in bed, during most of which time he was given intramuscularly the extract derived from 600 g. of liver each week, there was great improvement in the physical signs. Clonus disappeared; spasticity became much less; sense of position improved almost to normal; and vibration sense returned. Some re-educational exercises were given two

weeks before he was allowed to walk. On first getting up he walked alone without support. Improvement continued. The dose of intramuscular liver was reduced to the extract from 200 g. per week, which he still receives regularly. He now feels well and complains of no neurological symptoms whatsoever. Plantar responses are flexor but the excursion is small and there is still some fanning of the other toes.

Progress subsequent to discharge from hospital

Of the 66 cases of subacute combined degeneration discharged from hospital to carry on at home, 40 have taken the treatment as directed. In none of these did symptoms progress; many improved for a time, and all finally became stationary. Seven have died from other causes. Two of them were under close observation in hospital as they slowly went down hill, to die from carcinoma of the stomach. Both had presented moderately severe symptoms and signs of subacute combined degeneration, and both had improved greatly. It was notable that a recurrence of the neurological symptoms and signs did not accompany the increasing weakness and cachexia of carcinoma.

Twenty-two patients failed to take the prescribed treatment faithfully. Some of these ceased entirely to take any liver preparation; a number lapsed for short periods; others took variable quantities irregularly. Of this group, 7 became worse and died with subacute combined degeneration of the cord and its complications; in 7, the neurological lesions progressed;* and in 8 there was no appreciable change in nervous symptoms or signs.

Four patients cannot now be traced.

Progression of symptoms in the absence of definite anæmia

Among the 7 patients whose symptoms and signs of subacute combined degeneration of the cord became worse while taking liver imperfectly was one whose blood picture failed to show the changes diagnostic of pernicious anæmia. He had been admitted to hospital in 1930 quite unable to walk alone because of severe posterior column disease. On rest and large amounts of liver remarkable improvement occurred, and he returned to work as a labourer in the northern woods. Feeling well, he became careless of treatment and for many months prior to his second admission he ate cooked liver at most three or four times a week. In 1934, the old symptoms recurred. He returned to Toronto and was found to have symptoms and signs of severe combined degeneration of the cord, although his hæmoglobin was 86 per cent, red blood count 4,600,000, and there was no macrocytosis. Once more definite improvement occurred on prolonged rest and liver therapy (extract from 400 g. of liver given intramuscularly each week), but this time he was left with greater residual involvement than after his first admission.

* Most of these patients lived outside of Toronto.

COMMENT

Throughout the series improvement was greatest in those cases whose neurological symptoms and signs were of short duration. Improvement in symptoms far outdistanced the change in objective signs of neurological disease. In many cases, however, definite change in signs did occur. This was most marked in the sensory manifestations — superficial sensation, sense of position, and vibration sense. Not infrequently, however, knee-jerks or ankle-jerks previously absent on repeated examination could be elicited consistently after treatment. In two cases with typical Babinski phenomena gradual modification was observed till finally the response was flexor.

The fact that improvement in symptoms is quite out of proportion to the relatively less marked change in objective signs is not surprising. At best the signs of neurological disease are but a crude measure of the change in structure or function. Of two patients showing a similar type of extensor response one may be unable to walk because of weakness and spasticity, while the other goes about with little disability.

There appears to be no exact relationship between the extent of pathological change in the cord and the severity of the manifestations of the disease. One patient[8] who had improved greatly till she was able to walk well and do her household work without difficulty died following an operation. Most extensive destruction of the fibres of the posterior columns and pyramidal tracts was found at post-mortem examination. Apparently the surviving fibres, their function improved following rest and liver therapy, had been able to carry on the function of the tracts, much as remnants of other organs damaged in disease (liver, lung, etc.) may perform the function of the whole organ with little evidence of insufficiency. No therapy could affect the fibres completely degenerated, but surely it is tremendously important to further any type of treatment that will allow swelling and œdema of the hopelessly damaged fibres to subside, and arrest and facilitate repair of early degenerative changes in the surviving fibres. Till such improvement might be affected, protection of the diseased cord by complete rest in bed is obviously desirable.

Infections, especially infected bed sores and infections of the urinary tract, slowed up re-

covery from the anæmia and appeared to inhibit improvement of the neurological manifestations.

Physical therapy and re-education measures often increased the comfort of the patient and were helpful in convalescence, but did not seem greatly to affect the ultimate result, provided that the patient was eager to regain his lost functions.

Attention is drawn to the fact that severe manifestations of subacute combined degeneration of the cord may develop and progress in patients receiving liver therapy in the absence of definite anæmia while the blood picture remains within normal limits, and that under treatment with prolonged rest in bed and larger doses of potent liver preparations these symptoms and signs may be arrested and largely subside.

Undoubtedly the rise in hæmoglobin and improvement in general health is an important factor in the relief of symptoms. A defect anywhere in the body is always aggravated by weakness and failure of health from any cause. The most marked improvement in the manifestations of subacute combined degeneration of the cord, however, usually occurs several weeks or months after the recovery from the anæmia.

It is impossible to overemphasize the importance of persistency in treatment with administration of potent preparations in the dosage necessary to arrest progression of the disease. No matter how excellent the treatment and how early it is started, there is never complete recovery. Each exacerbation leads to further permanent damage of nervous tissue. It is true that patients with extensive destruction of the fibre tracts may carry on wonderfully well, especially when they take increased amounts of rest. Such patients, however, have less reserve and tire more easily than formerly. Moreover, with great fatigue some of the neurological symptoms (as ataxia or spasticity) may temporarily reappear.

SUMMARY AND CONCLUSIONS

The spinal cord lesions of pernicious anæmia can be prevented from developing and may be completely arrested by the administration of sufficient amounts of potent liver preparations.

Definite improvement occurs under treatment with prolonged rest and adequate liver therapy in those whose neurological symptoms are of relatively short duration. The best results are obtained when the potent extracts are administered intramuscularly.

Adequate dosage is that amount required completely to arrest progression of the lesion and to further improvement in function of the damaged fibre tracts. Because it is impossible in any given case to predict what that necessary amount will be it is suggested that the initial dosage be two to three times as great as that commonly used in the early treatment of patients suffering from pernicious anæmia without involvement of the spinal cord.

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PERIPHERAL NEURITIS CAUSED BY PROLONGED USE OF DINITROPHENOL.—J. E. Nadler deals with late or delayed cases of poisoning by dinitrophenol. The report is based on the study of twenty-two persons who took alpha-dinitrophenol (1-2-4). Fifteen were seen in private practice and the remainder in the wards of Bellevue Hospital. Sixteen showed no deleterious effects from the use of the drug; of the remaining six, in three a rash developed, in one loss of taste and in two peripheral neuritis. The six patients showing toxic symptoms were taking the drug for obesity and gave a negative history for allergy, neuritis, arthritis, alcoholism, diabetes, tuberculosis, or liver or kidney disease. Loss of the sense of taste as a result of intoxication by dinitrophenol developed in one patient after she had been taking the drug for thirty-six days. This loss was complete for "sweet", "sour", "salt", and the like, and she experienced a "coppery" taste in her mouth at all times. She was not anæsthetic to epicritic and protopathic stimuli, *i.e.*, to light touches, pin pricks and temperature. The sense of smell was unimpaired. The drug was not stopped and her taste gradually returned to normal in a month. The two cases in which peripheral neuritis developed following prolonged use of this drug are reported in some detail. These patients were on a diet containing adequate amounts of the vitamin B complex. They showed very striking sensory symptoms but no motor or trophic disturbances. The condition started in the toes and exhibited various disturbances of sensation, such as prickling, numbness and pain. Paraesthesia persisted long after its original cause had been removed. This delayed poisoning is due to repeated exposure to small amounts of dinitrophenol and not to an accumulation of the drug in the body.—*J. Am. M. Ass.*, 1935, **105:** 12.

BLOOD DYSCRASIAS AMENABLE TO TREATMENT BY SPLENECTOMY*

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IN temperate climates the blood dyscrasias which may be treated successfully by splenectomy are mainly three: familial hæmolytic jaundice; essential thrombocytopenic purpura; and splenic anæmia of the Banti type. These have but one feature in common, a striking clinical improvement after splenectomy, though this surgical procedure does not effect a cure in the physiological sense. A glance at the underlying pathology in these three diseases will show why this is so.

ESSENTIAL THROMBOCYTOPENIC PURPURA

The train of clinical signs and symptoms in idiopathic purpura hæmorrhagica is directly or indirectly the result of marked and persistent thrombocytopenia, the cause of which is a controversial point. Histological changes in the megakaryocytes of the marrow, particularly absence of granulation, have often been noted, but the rapidity with which physiologically normal platelets are produced after splenectomy argues against the fundamental importance of this histological change. On the other hand, cases may eventually show alarming degrees of thrombopenia after splenectomy without the resulting hæmorrhagic phenomena. It is of passing interest that only one of eleven cases of this disease observed by us and subjected to splenectomy suffered such a relapse, and in this case an accessory spleen was left *in situ* by the surgeon. Abnormal capillary endothelium, with resulting increased utilization of thrombocytes, has been suggested as the cause of the disease, but capillary changes have seldom been demonstrated. In this connection it should be pointed out that the excised spleen in thrombocytopenic purpura does not show changes in any sense characteristic of the disease, and comparable thrombocytosis occurs after removal of the normal spleen. The diagnosis in essential thrombocytopenia depends primarily on the demonstration of a marked and persistent thrombocytopenia, and this is true whether the case be of the acute fulminating type with multiple hæmorrhages from mucous membranes and into the skin or of the chronic type with a single hæmorrhage and latent purpuric manifestations. The prolonged bleeding time, the non-retractile clot, and the positive Hess or tourniquet test are not diagnostic; they merely indicate severe thrombocytopenia, which may occur in the course of many diseases, such as tuberculosis, syphilis, avitaminosis and anaphylaxis. Further, *the diagnosis should never be made when thrombocytopenia is accompanied by leucopenia, or anæmia out of proportion to the amount of hæmorrhage. Such cases are invariably latent leukæmia or aplastic anæmia.*

HÆMOLYTIC JAUNDICE OF THE FAMILIAL TYPE

From the surgical standpoint the removal of the spleen for acholuric jaundice of the familial type is a curative measure. The anæmia disappears, the muddy or icteroid colour clears up, and the patients become, to outward appearances, normal. However, certain physiological abnormalities persist. It has been known for many years that the blood in this disease shows certain cardinal abnormalities which, when taken together, are pathognomonic of the disease. The erythrocytes are much smaller and more spherical than normal. A large proportion of these cells are reticulated and show increased fragility to hypotonic saline. Such a combination exists in no other known disease and is a familial defect. Neither the bone marrow, which is hyperplastic, nor the spleen, which is engorged with blood, shows any characteristic gross or microscopic changes. Removal of the spleen, which may be very large or relatively small, effectively and permanently slows up erythropoiesis. The hyperplastic marrow undergoes regression and the reticulocytes disappear, but splenectomy fails to alter greatly either the size of the erythrocytes or their fragility. Splenectomy probably benefits the patient by removing an organ which is rapidly

* A paper introducing the Symposium on Abnormalities of Blood Formation in Relation to the Rôle of the Spleen, Atlantic City, June 13, 1935.

From the Medical Services of the Montreal General Hospital.

destroying a congenitally fragile erythrocyte in the normal manner.

The differential diagnosis of familial acholuric jaundice from other diseases is rarely difficult if hæmatological studies are carried out. As already mentioned, the combination of persistent reticulocytosis with small spherical erythrocytes showing increased fragility to hypotonic saline is pathognomonic of the disease. Other features, as bilirubinæmia, urobilinuria, and splenic enlargement are supplementary findings. It is important to remember that considerably more than half of all cases of acholuric jaundice of the familial type eventually develop gall stones, as a result of which obstructive jaundice may develop, thus masking the true underlying pathological condition.

SPLENIC ANÆMIA OF THE BANTI TYPE

Probably less than one out of four spleens removed by surgeons for splenic anæmia show the characteristic histological changes outlined by Banti. This estimate is based upon a review by C. P. Howard and the author of over 400 published reports. Indeed, there are those who deny the identity of this disease, though admitting the existence of the symptom-complex. The difficulty in diagnosis arises from the fact that there are so many diseases which present as part of their clinical picture enlargement of the spleen with leucopenia and a moderate hypochromic anæmia. Excluding these, there would appear to be a disease entity which shows pathologically very definite gross and microscopic changes in the spleen, and eventually a cirrhosis of the liver which is indistinguishable from the ordinary hepatic cirrhosis of the Laennec type. The spleen varies greatly in size. It may be only moderately enlarged, or enormous, extending into the pelvis. Thickening of the capsule with perisplenitis and adhesions to adjoining viscera and peritoneum are not infrequent. Histologically, the spleen shows varying degrees of fibrosis; the trabeculæ are thickened; the reticulo-endothelium hyperplastic; and the Malpighian follicles few and atrophic, often with hyaline degeneration. Diffuse fibrosis may be present. Endophlebitis of the splenic veins is a frequent finding, and this sometimes leads to actual thrombosis, which may extend into the portal and mesenteric veins, thus causing death.

The differential diagnosis of splenic anæmia in its pre-cirrhosis stage offers a difficult problem even to the most experienced clinician. We can recall at the moment instances of subacute bacterial endocarditis, aleukæmic myelosis, and aleukæmic reticulo-endotheliosis diagnosed as splenic anæmia and subjected to splenectomy. Even the pathologist's report of reticulo-endothelial hyperplasia lent some support to that diagnosis, and yet the subsequent course of the disease, and finally the autopsy, revealed the true diagnosis. Where the course of the disease is a chronic one, the spleen very large, the anæmia of the hypochromic type and moderate in degree, the granulocytopenia extreme, and hæmatemesis has occurred, the diagnosis is not difficult. However, this clinical picture is seldom present at the time when the diagnosis should be made and the spleen removed. Instances of idiopathic hypochromic anæmia not infrequently show the anæmia, the leucopenia, and moderate enlargement of the spleen. This disease can be excluded best by the therapeutic test. If the anæmia disappears as a result of adequate iron therapy splenic anæmia is ruled out.

The degree of anæmia is an important guide in diagnosis. Severe anæmia does not occur in true splenic anæmia unless hæmatemesis has occurred. In the review of many hundred cases by Dr. Howard and the author an erythrocyte count under three million invariably meant (unless there had been recent hæmatemesis) that the characteristic histological features of Banti's disease were not found in the spleen. Such cases usually proved to be latent leukæmia. A normal or high platelet count suggests idiopathic thrombosis of the splenic vein, as the platelets are invariably low in splenic anæmia. If malaria, syphilis, tuberculosis and tropical splenomegalies can be excluded, it seems fair to assume that any case presenting a persistent chronic hypochromic anæmia which resists proper treatment, and which shows leukopenia and an enlarging spleen and evidence of hæmolytic activity, as urobilinuria and bilirubinæmia, is splenic anæmia of the Banti type. The development of hæmatemesis or signs of hepatic cirrhosis simplifies the diagnosis though it materially lessens the hope of controlling the disease by splenectomy.

SPLENECTOMY: OPERATIVE PROCEDURE AND AFTER-CARE*

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MY remarks are corollary to those of Dr. Mills on "Blood dyscrasias amenable to treatment by splenectomy" and will necessarily be brief, as applying mainly to mechanical manipulation.

I wish first to emphasize some pitfalls in differential diagnosis, from the obverse of the picture.

1. Cirrhosis of the liver, with ascites and enlarged spleen, may simulate the third stage of splenic anæmia. Any major operative procedure is attended with the risk of overloading the already damaged liver, and a "liver death".

Again, even in Canada we occasionally meet with a chronic malarial splenomegaly, with no manifestations of active malaria and with a blood picture closely simulating splenic anæmia. Here splenectomy may be followed by chills and fever alarming to the surgeon until the discovery of the plasmodium in the blood reveals the true condition.

2. Aplastic anæmia may be mistaken for thrombocytopenic purpura, and death be hastened by splenectomy.

3. Gall-stone colic, common-duct obstruction, or other mechanical accident associated with gall stones may occur in familial hæmolytic jaundice and deflect attention from the underlying condition.

Pigment gall stones are present in from 50 to 80 per cent of patients with hæmolytic jaundice.

PRE-OPERATIVE PREPARATION

Blood transfusions are indicated in all cases with a hæmoglobin value below 50 per cent. With hæmoglobin between 50 and 60 per cent I believe it wiser and more economical of blood to defer transfusion until after the splenic pedicle is ligated. In thrombocytopenic purpura blood transfusions have a special significance. This will be considered later under the appropriate heading.

THE INCISION OF APPROACH

The incision of approach which I have found satisfactory is a left paramedian, which may be lengthened at will, and in healing preserves the integrity of the nerves and muscles of the abdominal wall. In some cases of Banti spleen with adhesions more room may be required to adequately deal with careful ligation of the thin-walled vessels in these adhesions. In such instances an oblique incision may run from the paramedian upward and laterally to the costal margin and parallel to the interstitial nerves. In hæmolytic jaundice complicated by gall stones a transverse incision will give adequate exposure for both splenectomy and cholecystostomy.

Intra-abdominal manipulation varies according to which of the three diseases is present.

HÆMOLYTIC JAUNDICE

Splenectomy is ridiculously simple. The spleen is only moderately enlarged, is not fragile; the lower pole is always free; there are no adhesions. The enlarging spleen may have stretched the peritoneum of the lieno-renal ligament so that it reaches almost to the extremity of the upper pole, high in the dome of the diaphragm, and there may be some difficulty in reaching this point, from which should commence the tearing through of the posterior layer of the lieno-renal ligament. With this division completed, the spleen is delivered through the incision and thrown towards the patient's right side. The tail of the pancreas should then be searched for, and stripped back from the hilus of the spleen, the hilar vessels clamped and ligated. On throwing the spleen over towards the left there remain but the vessels of the gastro-splenic omentum to be ligated and divided, and the spleen is free. Ligation of the splenic arteries prior to ligation of the veins, in order to reduce the bulk of the spleen and thus conserve blood to the patient, is theoretically advantageous, but I have never seen it work out practically and it takes added time.

* This paper formed part of the Symposium held in the Section of Surgery at Atlantic City, on Anomalies of Blood Formation in relation to the Rôle of the Spleen.

Preservation of the blood which flows in quantity from the removed spleen and re-infusion of this blood into the patient's veins does not appeal to me. We do not know just how the spleen acts in these diseases, nor what deleterious substance may be in this blood and splenic juice, particularly after compression and manipulation during the splenectomy. I would rather use a properly matched donor's blood.

Hæmolytic jaundice occasionally presents a crisis of hæmolysis, with high fever, delirium, and rapidly progressive anæmia. Examination reveals rapid breathing, cyanosis, and râles all over the chest. The patients may die—frequently with a diagnosis of pneumonia or influenza. It is probably wiser not to attempt splenectomy during such a crisis, but to combat the progressive hæmolysis and anæmia by repeated transfusions, deferring splenectomy until after the crisis has passed (*vide infra*).

SPLENIC ANÆMIA (BANTI'S DISEASE)

The spleen may be enormous, but the chief obstacle to splenectomy (and the chief operative risk) is because of the dense and vascular adhesions which abound from repeated attacks of perisplenitis. Indeed, it is the wise surgeon, who, after examining the condition, may decide to refrain from splenectomy and close the abdomen (*vide infra*). But when it is decided that splenectomy is feasible all visible adhesions, with their vessels, should be meticulously divided, after double ligation. In this way all of the splenic surface except that apposed to the dome of the diaphragm is freed from the surrounding structures. The surgeon should then boldly and rapidly strip with the hand the spleen from the diaphragm, tearing through the adhesions, keeping close to the surface of the diaphragm, rather than tearing into the splenic pulp. This procedure should be carried out rapidly and forcefully, and with no interruption in an attempt to stanch the blood flow, which is alarmingly profuse. The adhesions having been thus separated the hand should immediately proceed to the tearing through of the posterior layer of the lieno-renal ligament and the spleen rapidly delivered through the incision. Large hot gauze towels should immediately be packed into the dome of the diaphragm and the splenic bed, the tail of the pancreas stripped away, and the pedicle clamped. Time off can then be taken to remove the sodden towels, and appropriate measures adopted to secure bleeding points in the splenic bed. As these bleeders are only thin-walled veins it usually suffices to repack with hot towels. Transfusion may be started at this time if the condition of the patient demands it. The splenic pedicle is then securely ligated and divided, the vessels of the gastro-splenic omentum secured, and the spleen is free. The abdomen should not be closed until one is assured that the field is dry. In the ascitic stage an omentopexy should be added to the splenectomy.

THROMBOCYTOPENIC PURPURA

There is here no difficulty with the splenectomy *per se*. The spleen is only slightly, if at all, enlarged; there are no adhesions. But the tissues must be handled with the greatest respect. Hæmostasis of even the smallest vessels must be meticulous. In spite of this, there will be considerable loss of blood from capillary oozing. Packing back the intestine with gauze towels is not permissible. In most cases this is quite unnecessary, but when demanded a large square of wet rubber dam should be used. Metal retractors, if used at all, should be employed with the greatest care. The wet gloved hands of an assistant are the best means for attaining exposure of the field. If these precautions are not adopted serious subperitoneal hæmatomata may ensue, and even, as in one of our cases, a massive, concealed and fatal bleeding from the mucosa of the colon.

In this disease, blood transfusion plays an important rôle in both the pre-operative preparation and the immediate post-operative care. In the acute febrile fulminating type, with almost universal and constant bleeding, it may be the only means of treatment possible. Even massive blood transfusions may not combat the acute anæmia produced by the constant loss of blood. The platelets are destroyed almost as soon as they are given. In the severe, but not quite so fulminating, type of the disease operation may be successful if a massive blood transfusion is given immediately before and continued throughout operation (*vide infra*). In all cases blood transfusion should be frequently repeated after the splenectomy until the platelets have reached a point about 60,000 per

c.mm., a point above which further bleeding is not likely to recur.

LIGATION OF THE SPLENIC ARTERY IN CONTINUITY

This procedure, as an alternative to splenectomy, wherenever the latter procedure is inadvisable from one cause or another, has been employed in all three of the diseases under discussion. Van Goidsenhoven[1] first proposed it in acute fulminating cases of thrombocytopenic purpura, and Lemaire[2] reports upon 11 cases, 2 of which were acute (one death) and 9 of which were chronic (no deaths). The splenic artery is ligated after giving off its third pancreatic branch — arbitrarily half way between the midline and the splenic hilus. The splenic vein is not disturbed. A slow atrophy of the spleen results, but it is reported that the effects in thrombocytopenia are almost if not as prompt as in splenectomy. The bleeding ceases, the platelets rapidly increase, and the anæmia is recovered from. The method has been employed in splenic anæmia,[3] hæmolytic jaundice[4] and in "wandering spleen", strongly adherent in an abnormal situation.[5] We have had no personal experience with this ligation, but it would appear to be worthy of due consideration.

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THE RELIEF OF PAIN DURING LABOUR

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IN 1902, Steinbüchel[1] suggested the use of morphine and scopolamine for alleviating the pangs of labour. A great deal of experimental work has since been carried on, and the results, while controversial in some respects, have revealed steady progress.

Gauss,[2] in 1906, reported on 600 cases of alleviation of pain with morphine-scopolamine. Following some adverse results, the procedure lay dormant for several years, but in 1926, with the advent of the barbiturates, a fresh impetus was given to the study of analgesia, and lately the use of different combinations of drugs has effected varying degrees of success. Van Del[3] reported that in his experience a combination of sodium amytal and morphine best alleviated the pains during labour. Moore,[4] using several combinations of drugs, stressed the fact that each case must be individually studied. He used an initial combination of pantopon and hyoscine, and then either sodium amytal or pentobarbital sodium. Averett[6] reported excellent results following the administration of nembutal and scopolamine during labour and found no untoward asphyxia of the child. Claye,[7] in a small series, gave hyoscine, gr. 1/100, half-hourly for three doses, and then at intervals of two hours until delivery. Many mothers were restless, but no babies showed asphyxia, although one was drowsy for a few days. Irving, Berman and Nelson[8] reported on the use of varying combinations of drugs in a large series of labours. They considered amnesia to be best obtained by a combination of pentobarbital sodium (nembutal) and scopolamine. McGuinness[9] reported on the use of nembutal in a series of 139 labours with 80 per cent amnesia. He considered that nembutal greatly increased the effect of morphine on the mother, and the latter drug, moreover, acted as a marked fetal respiratory depressant. He discontinued the use of morphine and, instead, increased the dosage of nembutal. Daichman, Kornfield and Shir,[10] after using several combinations of drugs, considered that of sodium amytal and scopolamine to yield the best analgesic effect; while Ruch[11] thought that dilaudid and scopolamine gave satisfactory relief. During labour Birnberg and Livingston[12] administered dial intravenously with satisfactory results. Shute and Davis[5] claim that morphine administered during labour has not on the child all the bad effects ascribed to it, providing that during efforts at resuscitation the child is handled gently and no external stimulation is used, but rather CO_2 and O_2. However, the other writers are agreed, and warn that the use

of morphine or its derivatives during labour may have an untoward effect on the child. McIlroy[13] advised the use of potassium bromide with morphine and hyoscine during labour, with chloroform or ether inhalation for the actual delivery. McMahon[14] advised a combination of morphine or pantopon with hyoscine during the first stage of labour, with chloroform or ether inhalation for the delivery. Jaroschka[15] and Bohler,[16] using pernocton during labour, found it efficient as a sedative and non-toxic in either maternal body or placenta. Rosenfield and Davidoff[17] have lately reported complete and lasting amnesia from a combination of nembutal by mouth and paraldehyde by rectum. Their procedure is simple and safe, and the results appear to be very good. Calvin and Bartholomew[18] reported a series of cases in which they used the same combination plus morphine with excellent results. These men all claim that restlessness is decreased, but this in variance with the result stated by Irvine *et al.*

It is thus evident that many drugs, both alone or in combination, have been used, and with their use several factors must be stressed. The life of the child must not be prejudiced, and neither operative interference nor maternal mortality and morbidity must be markedly increased. One will have to admit, perhaps, that the number of low-forceps applications will increase, but not the mid- or high-forceps applications. Unquestionably, in the last few years there has been a persistent demand by women for short painless labours, supported and influenced by the publicity in the lay press afforded to "relief of pain". Unfortunately, however, women have not paid as much attention to the possible bad results. In the past, it is true, a long severe labour with no sedative has been, for most women, a trying experience. We are justified then, in every way in trying to find an ideal combination of drugs whereby the pains and severity of child-birth may be alleviated, always providing we add no unnecessary risk to mother or child; but the attempt to obtain amnesia in home or hospital should not be made unless attendants are present from the time sedatives are given until the baby is born.

This report covers 418 cases of pregnancy wherein delivery of a viable child was effected. Of these patients, 36 were excluded, 4 were delivered by Cæsarean section, and 32 were delivered very soon after admission to hospital. A further 48 were given some sedative, but were not in hospital before delivery long enough to enable an adequate dosage to be given. These cases then (80) were failures and represented 19.1 per cent of consecutive admissions in which we were reasonably unable to obtain a satisfactory amnesia. The importance of entering hospital early in labour needs to be stressed if a satisfactory analgesia and amnesia is to be obtained.

Various combinations of drugs were used. In the first 150 cases morphine sulphate with hyoscine hydrobromide and (or) pentobarbital sodium (nembutal) were used, while in the later cases nembutal and hyoscine were used. When deemed necessary (*i.e.*, in restlessness) pernocton, 2.2 c.c., either intravenously or intramuscularly, was given. We have used the nembutal-paraldehyde combination in too small a series of cases, but have, to date, secured excellent amnesia without undue restlessness.

The routine of administration was necessarily not rigid. Early in the series, either on admission or when pains were well established or the cervix was dilated 2 cm., morphine, gr. 1/8, and hyoscine, gr. 1/100, were given hypodermically. Following that, nembutal, gr. 3 by mouth, or hyoscine, gr. 1/100 h.,* was given in successive or alternate doses, twice for each. Later doses might be halved. Occasionally, when restlessness supervened, pernocton, 2.2 or 4.4 c.c. (in proportion to the patient's weight), was given intravenously, and, later, if necessary, repeated by intravenous or intramuscular injection. When the cervix was fully dilated and the head below mid-pelvis, the patient was removed to the case-room, exhorted gently with each pain to bear down, the while nitrous oxide inhalations were given; this till delivery was completed, either spontaneously or by the timely and warranted intervention of the accoucheur. In the latter part of this series we omitted the morphine and gave instead nembutal, 3 to 6 grains, depending on the patient's weight, followed by hyoscine, gr. 1/200 h. or nembutal, 3 grains. Following this, nembutal or hyoscine were alternately given in equal or halved doses. The dosage varied in each case, as individual response to these drugs was so variable, both in degree and speed. Following delivery of baby and placenta, pituitrin, 0.5 c.c., and gynergin, 1 c.c., were given hypodermically. The patient

* "h" is an abbreviation for "hypodermically".

was kept in the case-room for 1 to 1½ hours, and then removed to her bed.

The effect of these drugs, given to obtain amnesia and analgesia, was investigated from several aspects: (1) the immediate effect on mother and baby; (2) the effect at delivery; (3) the effect on the new-born; (4) the effect post-partum.

1. Ten or fifteen minutes after the initial dose, whether of morphine and hyoscine or nembutal, the patient becomes drowsy, and in many cases sleeps between pains. The duration of quietude varies in proportion to the severity of the pain and the temperament of patient. Usually, about ½ to 1 hour later, a second dose is necessary, and thereafter each 1 to 4 hours later. During this time the pulse is usually regular and slow, the face slightly flushed, the skin moist, even to perspiration, the pupils equal and slightly dilated. The breathing is regular, but where somnolence is attained may be slightly stertorous. The room should be shaded, the atmosphere and attendants quiet, and all treatment or examination should be gentle and deliberate. A rise in pulse rate, slow or laboured respiration, marked dilatation of the pupils, and cyanosis are danger signs and must be avoided or recognized. Early in our experience we repeated the hyoscine, gr. 1/100 h., twice or thrice in succession. In a few cases there was marked restlessness, with a rise in the pulse during the pains, which necessitated constant nursing vigilance to prevent the patient falling out of bed. The intravenous injection of pernocton, 2.2 or 4.4 c.c. (at a rate of 1 c.c. per minute), induced unconsciousness safely almost at once, which lasted for ½ to 2 hours following. To obviate this restlessness and also the occasional cyanosis in the baby we discontinued the morphine and hyoscine, 1/100 gr. Instead, we now give nembutal 3 to 6 grains by mouth, and follow it in 15 to 45 minutes with hyoscine, gr. 1/200 h.; then in another hour by further nembutal, 3 gr., then we repeat hyoscine, gr. 1/200 h. and, later, nembutal, 3 gr. If this dosage is given early, the effect is excellent and lasting, and later doses of nembutal or hyoscine may be halved. Moreover, restlessness is uncommon, and then occurs during the second stage, when it can be controlled by nitrous oxide inhalations. Twenty patients showed a marked degree of restlessness (14 primiparæ and 6 multiparæ). Of these, 12 (9 primiparæ and 3 multiparæ) exhibited it early in labour and needed, in 7 cases only, pernocton to quiet them, while in 5 cases pernocton and nitrous oxide and ether anæsthesia were necessary to maintain control of their movements. The remaining 8 patients who manifested restlessness late in labour were easily controlled by nitrous oxide, with, in some cases, the addition of a small amount of ether.

The duration of labour was decreased under sedative treatment. Eighty per cent of primiparæ were delivered under 12 hours, while the average duration of labour in the multiparæ was 6 hours. In cases of prolonged labour with severe and exhausting pains signs of maternal exhaustion appeared much later, or not at all. The heart of the fetus was not adversely affected by sedatives; indeed, in tempestuous labours its rate, regularity and volume showed improvement.

2. We must acknowledge that the incidence of low or perineal forceps delivery is increased slightly, especially in primiparæ. This is due to a decrease in power of that "perineal urge" stimulus that marks the presence of the presenting part on the perineum, in this case due to sedatives, but formerly seen quite often as an involuntary "tensing" of the perineum in nervous women. The incidence of mid-forceps interference is not increased; in fact, in some cases the patient may be carried for longer periods, thus allowing descent or rotation to take place. A decreased amount of anæsthetic need be administered as the basal anæsthesia is optimum. Any manipulation is rendered less difficult, as the patient is well relaxed.

The duration of the third stage averaged 11 minutes; in 80 per cent of the cases it was less than 10 minutes. The loss of blood averaged 200 c.c., but in 8 cases amounted to more than 500 c.c. Three of these patients received no sedative. Of the remaining cases, 2 were low-forceps deliveries, 2 were mid-forceps applications, and the remaining patient was delivered spontaneously. In all an atonic uterus was at fault. We did not consider the sedatives as causative factors.

3. Twenty babies showed signs of asphyxia, 12 in the case of primiparæ, and 8 in multiparæ. Eight cases were spontaneous deliveries, 6 were low-forceps, 4 were mid-forceps, and 2 were

breech-extractions. In 17 cases the baby responded easily to inhalation of CO_2, 7 per cent, in O_2. One baby delivered by mid-forceps died in half an hour; 1 delivered by breech extraction died from intracranial injury, and 1 delivered spontaneously died in 1 hour for no apparent reason. There were 24 premature babies, in which cases 1 twin was with difficulty resuscitated; 5 died later, 3 from bronchopneumonia. In only 3 cases did we ascribe sedatives as a cause for fetal asphyxia. These occurred early in the series and led in part to our discontinuance of morphine. Our procedure now is to give the mother oxygen and CO_2 (0.3 litres per minute) while the head is crowning. The mucus is aspirated from the baby's mouth, and the maternal inhalations are continued as long as the cord pulsates. This has proved extremely satisfactory in practically all instances, and has obviated all other and possible sterner resuscitatory methods.

4. The mother usually roused after delivery, then slept quietly for a period of one-half to five hours, awoke, and was unaware her baby had been born. About 50 per cent of the mothers remained "dopy" for twelve hours following, but all had recovered by the end of the first day. Five per cent of the patients complained of blurring of vision, diplopia, or intolerance to light, but in a quiet shaded room these all cleared spontaneously. At first, one in every four patients had dry, parched lips and a great thirst following delivery. This was later appeased when they were allowed fluids *ad lib.*, or prevented when the fluid intake was forced during early labour. There was no increase in urine retention. The course of the puerperium was in most cases a much happier one.

The gross maternal morbidity rate, based on a single rise of over 100.8° F. at any time after 24 hours post partum, was 10.2 per cent. There were 20 primiparæ and 10 multiparæ morbid; of these, 8 primiparæ and 10 multiparæ had single rises. Thus the morbidity of total primiparæ was 12.8 per cent and that of multiparæ, 6.3 per cent. This is gratifyingly low. The results were graded as follows:—

Grade 1. Excellent.—No memory of pain or labour throughout the course.

Grade 2. Good.—Relief of pain, with slight degrees of awareness during labour.

Grade 3. Fair.—Comfort, but memory of a great part of labour.

Grade 4. Poor.—No amnesia and very little analgesia.

TABLE I

Grade		1	2	3	4
		Percentage	*Percentage*	*Percentage*	*Percentage*
Primiparæ	170	60.0	24.2	13.7	2.1
Multiparæ	212	29.2	23.9	26.8	20.1

Grades 1 and 2 are considered satisfactory.

As the Table shows, in primiparæ satisfactory amnesia was obtained in 84.2 per cent of cases, while the failures averaged 2.1 per cent; in the shorter labours in multiparæ, in only 53.1 per cent of cases was the amnesia satisfactory. In the whole series, a satisfactory amnesia was obtained in 66.6 per cent.

In the first 150 cases, wherein the initial dose was morphine and hyoscine, satisfactory amnesia was obtained only in 53 per cent, a figure much lower than that given by other writers. The explanation is simple. We were cautious, and, especially where using morphine and hyoscine alone, were timid about giving the second dose too soon after the first. As our experience increased and nembutal was added we found that larger doses could more quickly and safely be given, and, consequently, our satisfactory results increased in number. We believe morphia to have no definite effect on primary fetal respirations if given at a time less than one or greater than four hours before delivery. However, the fact that a combination of hyoscine and nembutal can be safely given even within one hour before delivery, and, moreover, that a much larger dose over a longer period can be given, led us to abandon the use of morphine altogether. We are now giving larger initial doses of nembutal (grains 6 to 7½) and following it with either hyoscine or a second dose of nembutal (grains 3) at a much shorter interval. In this way we are securing not only greater analgesia but better and more prolonged amnesia. Moreover, the patient can be satisfactorily carried late in labour on half doses, thereby obviating the restlessness that ensues when the initial dose is wearing off and the pains are at their height. The fact that we have secured satisfactory amnesia in 76.3 per cent of all cases since using the procedure just mentioned is ample proof of its efficacy.

The duration of labour in hospital is important. The patients must be admitted early

in labour. In those primiparæ (35 per cent) in hospital labour for more than 15 hours satisfactory amnesia was obtained in 96 per cent of cases, whereas for the remainder, in labour less than 15 hours, only in 77.5 per cent was the amnesia considered sufficient. In the multiparæ where the average labour lasted 5 hours, only in 53.1 per cent were we able to obtain amnesia, which was in practically every case due to the limited time of administration at our disposal. The administration of sedatives must begin on admission or as soon as the pains have definitely started. A too-early dose, while not stopping the pains, may render them irregular and futile, and thereby prolong the labour. Experience obviates this. Once commenced, the dosage must be repeated at regular, and, if necessary, frequent intervals, proportionate not only to the severity of the pains but also to the size, tolerance and speed of reaction of the patient.

We frankly confess that the failures are due in the majority of cases to the paucity of sedatives administered. We have given as much as 13 grains of nembutal during a 24-hour period with no ill-effects, so that the question of overdosage but rarely arises. Where, however, the patient arrives in the hospital in the late first or early second stage her delivery is completed before any drugs given to her have time to act. Thus it is essential for satisfactory analgesia and amnesia that the patient arrive in hospital early, and, moreover, that induction be started early and maintained. Individual desire for no sedative is occasionally encountered; 5 patients refused any sedative and, of these, two refused any anæsthetic, but these are exceptional cases. More often, the nurse or intern inaccurately judges the progress of labour, or else gives the sedative by the clock —to the displeasure of both patient and doctor. We, with Irvine *et al.*, agree that the routine of administration must, necessarily, be left to the permanent staff; furthermore, it is our opinion that since our intern staff rotates so frequently, we obtain better results if we establish a basic routine and leave its actual application to the nursing staff.

The procedure should be confined to hospital practice. In the home, it should only be employed where either a trained obstetrical nurse or the doctor himself are in constant attendance from the time of first administering the sedative until delivery is accomplished. In no instance did we feel that mother or baby suffered any ill-effect from the sedative. Labour took no longer, delivery was as easy, and recovery as quick and complete as without a sedative. We do feel, however, that to the nervous, apprehensive mother, the gift of amnesia during labour is an inestimable boon.

We wish now to add a series of 103 cases, wherein was used a combination of nembutal by mouth, paraldehyde by rectal instillation, and, occasionally, for restlessness or insufficient sedation, pernocton intravenously. The cases numbered 41 primiparæ and 63 multiparæ and ranged in duration of labour from 1 hour to 49 hours.

THE METHOD OF PROCEDURE

(*a*) Nembutal, grs. 6 by mouth, was given when the pains were regularly established or the cervix dilated to the diameter of a quarter. This followed or even accompanied the "shaving and enema" preparation.

(*b*) Paraldehyde (drachms 6, if under 150 lbs., drachms 8, if more) in 1 ounce of olive oil instilled per rectum. This followed the nembutal in 30 to 60 minutes, depending of course on the severity of pain and the tolerance of the patient. She was turned on her side and the buttocks elevated by pillows. A measuring glass and stirring rod, a number 22 rectal tube, and a large bulb syringe are required. The rectal tube, lubricated, was inserted gently to the required distance, 6 to 9 inches; the stirred mixture was drawn into the syringe, which in turn was attached to the rectal tube, and the mixture forced into the bowel gently yet quickly. The tube was withdrawn, the hips left elevated, and the buttocks were held together for at least one-half hour. The success of this manœuvre is dependent on three factors—a minimum volume of mixture, the height and rapidity of instillation, and continued pressure against the buttocks to prevent expulsion.

(*c*) Nembutal, grs. 1½ to 3, at any time following the paraldehyde, repeated if necessary; or paraldehyde, drachms 4, repeated once or twice in 24 hours.

(*d*) Pernocton 2.2 c.c., intravenously, may be used at a late stage for restlessness or where there is inability to swallow.

THE COURSE OF LABOUR

The nembutal rendered the patient drowsy for a varying length of time. In from 10 to 30 minutes (usually 20) following the paraldehyde the patient fell quietly asleep, with even breathing, good colour, slow pulse, with the odour of paraldehyde on the breath. She would rouse slightly with each pain but they continued unabated, dilatation proceeded apace, and the fetal heart continued unruffled. Rectal examinations should not be made for, if possible, 1 hour after the instillation, as the mixture will escape. After 2 to 6 hours the effect may wear off slightly, but nembutal, gr. 1½, will usually be sufficient for control. Undue restlessness was present in two cases in this series. In 2 cases, following the paraldehyde a severe itchiness developed after 10 to 15 minutes; this disappeared in 30 minutes. During the second stage the woman would bear down well, and for delivery and repair would need only a slight additional amount of nitrous oxide. Four primiparæ and 6 multiparæ needed no gas whatsoever.

There was a higher incidence of forceps delivery, but in this respect this is not representative, as in 15 primiparæ and 6 multiparæ a persistent occiput posterior presentation needed rotation and the application of forceps to effect delivery. In 5 of these cases the baby showed asphyxia; in another case the cord was tight around the neck; in all of these recovery took place. One baby died *in utero* during the course of a long dry labour in a primipara with the occiput rotating posteriorly; the post-mortem examination disclosed asphyxia.

If paraldehyde was given late in labour it was present on the baby's breath and body for 24 to 30 hours following delivery; if given early it was not noticed. In many cases the babies were listless for the first 24 hours; they breathed easily and were of good colour, but they took feedings poorly; this was, however, transient.

Post-partum hæmorrhage occurred in one instance. A multipara, given paraldehyde late in labour, suddenly effected a breech delivery twenty minutes later. A blood loss of 1,000 c.c. from the atonic uterus followed. The uterine cavity was packed, gum acacia, 6 per cent, was given intravenously, and the woman made a good recovery. As a routine following delivery, side-boards were placed on the bed, even with a nurse in attendance. The patient would sleep for 6 to 12 hours, remain somnolent for perhaps another 12 hours, and then awake. There was no intolerance to light, rarely headache, and no memory of the pain or discomfort of the labour from the time even before the paraldehyde instillation. These patients were, however, very thirsty, as it was difficult to supply adequate fluid by mouth during labour.

While we realize this is but a small series, our results are nevertheless gratifying. Of the primiparæ 41, or 97.6 per cent obtained excellent amnesia; the failure occurred in a labour lasting 2 hours — much too short to secure amnesia from the time of administration. Of the multiparæ, 54, or 88.5 per cent, obtained excellent amnesia. The 7 failures were, in 4 cases labours of less than 3 hours; while in 3 cases relief from pain was secured, but amnesia was unaccountably absent.

In our experience, this combination has yielded much the best results—results measured not only in excellence of amnesia and analgesia but also in lack of restlessness during labour and absence of harmful effect on both mother and baby.

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THE USEFULNESS OF ANÆSTHETIC AGENTS*

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ALTHOUGH of more particular interest to the anæsthetist, anæsthetic agents and methods of their administration are finding application in many phases of clinical practice in which they were not used previously. For example, the large bore, soft rubber tube, with one end bevelled so that its point separates the vocal cords and thus facilitates its entrance into the trachea through the glottis, is a useful device not only in the administration of general anæsthetics by inhalation but also in the resuscitation of persons who are unable to breathe either because of respiratory obstruction or respiratory paralysis. Everyone who practises medicine faces a situation sooner or later in which the patency of the patient's airway must be restored. In my experience the Magill intratracheal tube just described makes a patent airway possible. In carrying out artificial respiration with the tube one may adopt any available method, from simple mouth-to-tube insufflation to the use of a mechanical apparatus for pulmonary ventilation. A patent airway greatly facilitates the administration of a general anæsthetic. If it is advantageous to eliminate the mask from the face when it is in the field of operation, the tube may be connected to the adapter, and the operative field is then not encroached on by the anæsthetist and his devices.

ANÆSTHETIC AGENTS IN OBSTETRICS

Anæsthetic agents are employed generally in obstetrics, or at least they should be. Chloroform has been retained because of its long-continued use in certain places, but I think that its use as an anæsthetic agent is not justified unless it can be shown, as has been suggested previously, that it is safer when vaporized with oxygen than when vaporized with air; as it is usually given I do not recommend it. Ether by the open drop method is relatively safe, and is the most valuable anæsthetic agent yet available. The gaseous anæsthetics, especially nitrous oxide and ethylene, are valuable for obstetric patients, but because of the problem of portability of the gas machine and the devices necessary for the administration of such gaseous agents their value is less than it would be otherwise. In institutions, however, they are the anæsthetic agents most often used.

In some places avertin (tribromethyl alcohol) has been advocated, but it is not generally used because of the resulting inebriation of the patient during delivery and even between pains. In small doses, that is, in doses sufficient to produce only brain block, it is a valuable adjunct for preparing the patient for operation and anæsthesia. Colonic oil-ether anæsthesia is used for certain primiparas, and it can be used, as can avertin, in obstetric cases, although it increases the amount of attention that the patient must receive from either the obstetrician and his assistant or the nurse.

Experience gained in the use of the barbiturates intravenously, intramuscularly, or orally, has resulted in the general custom of administering them by mouth to obstetric patients in small doses; for example, pentobarbital sodium, 3 grains (0.20 gm.), when the cervix becomes dilated to two fingers' breadths. This dose may be repeated in three or four hours if it seems advisable. A general anæsthetic agent, such as ether or gas, or gas and ether, would then be used in the actual delivery of the head over the perineum. The barbiturates are, however, very useful when given intravenously in the presence of convulsive conditions, for example, tetanus, eclampsia, or when such a convulsive condition is the result of strychnine poisoning. They are often given in general practice in this

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fashion when an emergency exists and the patient must be brought under immediate control.

ANÆSTHETIC AGENTS IN INTERNAL MEDICINE

The antispasmodic effect of the barbiturates is well illustrated by a recent case.

> The patient was a white girl, thirteen years of age, in whose hand a sliver, 1 inch long, had become lodged. Ten days later the sliver was removed by her father, a farmer. On the twelfth day the girl began to have difficulty in swallowing. On the fourteenth day convulsions appeared and she was hospitalized. In the ensuing fourteen days, 1,200 grains (80 gm.) of sodium amytal were given, at first in capsules by rectum, and later in a solution through a Rehfuss stomach tube. Early in the patient's period of hospitalization the pædiatrician in charge wanted to try avertin. A dose of it was given, which was effective. At another time during the illness avertin was again used successfully when considerable fever developed both from the disease and from the effect of the barbiturate. Pulmonary œdema had also developed.*
>
> It was found that this feature could be controlled by raising the foot of the bed, thus lowering the head, and by administering moistened oxygen by the nasal catheter. The patient had the usual treatment for tetanus and made a complete recovery.

The simplicity of the methods employed encourage me to recommend them because they do not require institutional facilities for their employment, and the results in this case bear me out in a previous statement that the dose of the barbiturate and not the method of its administration is the important factor. Obviously, if a convulsive condition, such as tetanus, can be controlled, any of the other conditions of spasm may be controlled, as well as conditions of insanity, when the patient must be transported for some distance and a strait-jacket is not available. This method can be employed in cases of injuries to the head when the patient becomes maniacal, as was illustrated by the reports of Love.[2]

Not infrequently a person is afflicted with hiccough. C. W. Mayo[5] and Rosenow[6] have shown that in a certain percentage of cases in which patients suffer from this condition encephalitic antistreptococcus serum sometimes affords relief. In some cases the phrenic nerve is crushed. All manner of cures have been suggested. One that I have utilized with success in some cases is the intermittent administration of 10 per cent carbon dioxide and 90 per cent oxygen, asking the patient to inhale for one to three minutes. After deep breathing has been established the procedure is discontinued until there is recurrence of diaphragmatic spasm. In some cases I have found that the administration of small amounts of pentobarbital sodium, alone or in combination with oxygen and carbon dioxide, has given relief. This treatment is obviously of no avail in the presence of acute intra-abdominal infection or of a lesion causing this difficulty.

The use of oxygen and carbon dioxide during the post-anæsthetic period for the elimination of ether and for hyperventilation of the lungs has been advocated in certain cases, to speed up recovery and to inflate atelectatic patches of lung, or the whole lung, especially when there has been positive pressure in the bag, so that the patient can exhale against this pressure.

Alcoholic intoxication may be treated by the administration of 5 per cent carbon dioxide and 95 per cent oxygen, which will restore the patient from relative inebriation to relative sobriety in a very short time. Patients with delirium tremens may be given a barbiturate, intravenously, to quiet them, and 3 mg. of ephedrine are given with each cubic centimetre of solution, containing about 1½ grains (0.097 gm.) of sodium amytal, so that when the amytal tends to lower the blood pressure, the ephedrine supports it. One must be careful with such patients, as they usually are exhausted and dehydrated, and frequently they are semi-starved. For certain persons who have indulged in alcohol to the point of having developed hyperacidity, and occasionally even symptoms of gastritis, it has been found advantageous to administer a barbiturate, such as pentobarbital sodium, 1½ to 3 grains (0.097 to 0.2 gm.) at bedtime, and to repeat in doses of ½ grain (0.032 gm.) three times a day for a day or two after the debauch. This seems to provide more relief than can ordinarily be obtained except when an alkali such as sodium bicarbonate is also given, not with the barbiturate but about an hour afterward.

Barbiturates have been advocated for seasickness to control the nausea and vomiting, and considerable success has attended their use; they have also been recommended for the morning

* Such œdema, resulting from large doses of barbiturates, is a common occurrence, and when patients have committed suicide by taking large doses of a barbiturate, necropsy has always revealed pulmonary œdema or bronchopneumonia. A long period of addiction to a barbiturate is usually followed by suicide, and such addiction is growing steadily. It may be said with some confidence that a patient who does not suffer pain and who is addicted to a barbiturate belongs to the group of emotionally unstable, constitutionally psychopathic, inferior persons.

nausea of pregnancy, for the colic of infants, for air sickness, and for mountain sickness. In this day of extensive travel by all modes of transportation, it is often advantageous to be prepared against the unpleasantness that may occur on a long trip.

Anæsthetic Agents in Surgical Procedures

The use of spinal anæsthesia and sacral block in obstetrics should, I think, be confined to operative obstetrics. However, when these measures are employed I think that the agent utilized should be procaine (novocaine); it is the agent of choice if one wishes to infiltrate the perineum just mesial to the tuberosities of the ischia for field block of the perineal nerves.

Local anæsthesia is desirable for operations on the digits, but the anæsthetic must not be injected at a great pressure and the concentration of the solution should not be greater than 1 per cent. It is best to omit epinephrine (adrenalin) or other vasoconstrictors in making up the anæsthetic solution, and trauma with the needle must be minimized. For acute fractures, a 2 per cent solution is injected in the hæmatoma, and in chronic fractures the periosteum and tissue immediately surrounding the fracture must be infiltrated. In operations in the soft tissue, field block may be performed. Although it is not often that one needs to employ brachial plexus block there are times when it is most useful. The technique is very simple. The point of injection is just above where the brachial plexus passes around the subclavian artery. Usually a 2 per cent procaine solution is used, with a dose of about 30 c.c. The solution should be injected slowly, so that if an intravascular injection is accidentally made, the effect of the procaine in the blood stream will become apparent before more than a small quantity has been administered. The symptoms produced by such intravascular injection of procaine are the very sudden appearance of pallor and a fall in blood pressure, sometimes slowing of the pulse rate, and twitching, sometimes marked convulsions, and, not infrequently, a few minutes of unconsciousness.

Ethyl chloride may be used to produce general anæsthesia if there is no other anæsthetic available, but if one has a choice I do not recommend it. It may be used, however, to freeze an area to be incised when anæsthesia is to be established by that physical phenomenon. An exception is the dental case in which an attempt is made to freeze the gum. In one such case I encountered, the patient had inhaled the fumes until he had become unconscious, and the operator had been unaware that the patient was anæsthetized by the systemic effect of the ethyl chloride. In some institutions this agent is used purposely as a general anæsthetic, with success by those who are experienced in its use.

Barbiturates, administered by the mouth in small doses prior to the administration of a local anæsthetic agent, tend to reduce the danger of reactions because of the specific antispasmodic effect of the drug. The use of barbiturates, such as pentobarbital sodium, prior to both surgical and dental operations has been satisfactory. The dose need not be large, but it should be given at a sufficient interval before operation so that the patient will be spared fear and apprehension. This, in itself, makes the operation less unpleasant and reduces the amount of anæsthetic necessary to produce satisfactory results. For surgical or dental operations one must avoid the use of doses of procaine which may prove toxic. Several factors are to be considered, which have to do with age, weight, blood pressure, pulse rate, concentration of the solution, total amount used, and the rate of injection, as described previously.[3]

Epinephrine is so frequently used, and is so valuable an adjunct in conjunction with local anæsthetic agents, that many have been disturbed by the fact that it, in itself, may cause reactions in some nervous or hypertensive patients; accordingly, substitutes have been sought, the two best known of which are ephedrine and cobefrin (1, 2-dihydroxyphenyl-4-propanolamine). Because of the short action of epinephrine, ephedrine has supplemented it in connection with spinal anæsthesia in which it has been relied on to combat the vasodepression usually associated with this form of anæsthesia. Cobefrin is a synthetic product which is being investigated and which is used mostly by dental surgeons, but as yet it has not been used in sufficient concentration to be as satisfactory as epinephrine, from the point of view of a dry operative field. This may be due to an insufficient dose being used. Ephedrine,

on the other hand, does not seem to be at all satisfactory as a local vasoconstrictor, at least in the strengths in which it has been used.

From the time that Fischer and von Mering introduced veronal, in 1903, there have been continuous and various developments on the malonic acid side of the barbituric acid ring. Recently, a new barbiturate has been introduced; it is called evipal soluble (sodium salt of N-methyl-cyclohexenyl methyl barbituric acid), and in it a methyl group (CH_3) has been substituted for a hydrogen on the urea side of the nucleus. There is considerable literature on this new agent, including several reports of untoward results from its use. Probably, the most recent of these is the report of paralysis in one case following the use of evipal soluble as a general anæsthetic.[1] The introduction of this agent has opened up the field of synthesis of the various barbituric acid derivatives, so that many new drugs may be expected. Evipal soluble is given intravenously, usually to produce anæsthesia for short operations, and in some instances the whole dose has been given in one injection. When circumstances permit, however, it may be better to retain the needle in the vein and to inject more of the agent as it is needed to maintain anæsthesia.

The newest agent in this new group of barbiturates is thionembutal (number 8064), the sodium salt of ethyl-1-methyl butyl thiobarbituric acid in which sulphur has been substituted for oxygen on the urea side of the malonylurea nucleus. This agent is about a third more potent than evipal soluble, but produces no longer period of anæsthesia. When either has been used it has been found advantageous to give some preliminary medication, a little morphine by hypodermic, or, especially in dental cases, morphine intravenously in small doses, followed by the intravenous injection of the barbiturate. Our experience at the clinic thus far with this agent leads me to believe that it has considerable promise, although I am not yet prepared to advise it for general use. I mention it here because I think that in the near future several new barbiturates will be introduced for anæsthesia of short duration by intravenous injection. In connection with the use of morphine intravenously it will be of value when pain is intense and immediate relief is desired, such as in stone in the ureter, renal stone, and gall-bladder colic, and so forth.

Recently, the question has been raised as to whether the barbiturates are responsible for the condition called agranulocytosis. The feeling is rather general that the barbiturates are not specific in causing this condition, but that a person who has developed agranulocytosis, or who is about to do so, might be affected in an untoward fashion by some drugs, especially by amidopyrine (pyramidon), and, possibly, by the barbiturates. Until this question is settled it would be wise to make a blood count in a case in which the patient is taking a barbiturate over a period of time and has sore throat or other signs of agranulocytosis, in order to see if the leukocytes are decreased in number and their character altered. In this way the condition might be recognized early.

The question has also been raised as to whether some patients who have suffered from drug allergy have shown untoward results from anæsthetics. It is an established fact that some individuals have an idiosyncrasy for certain drugs, and it is well recognized that certain dentists have difficulty with the skin of their hands when contact has been made with procaine after they have become sensitive to it. The reason is not clear, but until the matter is settled, if there is any previous history of untoward effect from a local anæsthetic one should use a patch test, which is to contact the skin with a small piece of material impregnated with the drug. One may drop a small amount of the solution into the eye or nose, or raise a wheal in the skin with a very small quantity of the solution. If the patient is sensitive to the agent it will become evident. In certain cases in which persons suffer from asthma or hay fever and appear to be definitely allergic it has been observed that very small doses of drugs have caused serious untoward effects; a fatality resulted from the administration of 5 grains (0.30 gm.) of acetylsalicylic acid (aspirin). It is well in cases in which patients are known to be sensitive to foods to be cautious in the administration of drugs. In the event that individuals have become ill from the use of a drug, it may be necessary to administer epinephrine, morphine, and, in some cases, an intravenous injection of a soluble barbiturate.

INTRAVENOUS THERAPY

Not infrequently conditions are met in which the patient would be benefited by the administration of normal saline or glucose solution. When these are used it is wise to introduce the solutions at a relatively slow rate, that is, approximately, 15 c.c. per minute. The rubber tubes, connections, and glass containers used should be carefully prepared, so that no soluble foreign material will be introduced into the solution as it passes through the equipment.

In some cases in which a transfusion of blood seems necessary one may in many instances utilize 6 per cent acacia as a substitute for blood. In many instances, however, it may seem best to use blood, and this may be done by either the direct administration of whole blood or by the indirect method of utilizing citrated blood. At The Mayo Clinic, the indirect method is preferred. Blood is drawn into a container which contains 50 c.c. of normal saline solution and 18 grains (1.2 gm.) of sodium citrate. This is mixed as fast as the blood is drawn, and the amount withdrawn is usually 300 to 500 c.c.[4] One difficulty I have observed in drawing the blood is that when the large bore needle has been sharpened across the whole surface of the bevel the needle acts as does a cookie-cutter and engulfs pieces of tissue, especially fat. After some blood has been gathered the flow will stop and it will be found that the needle is plugged. In order to avoid this I have used a needle that has a stylet in it and is more or less a miniature gall-bladder trocar. However, if such a needle is not available, one may resort to the use of a skin awl or pick, with which a round opening can be made in the skin next to the vein. The hole in the skin can then be superimposed over the vein and the needle inserted into the vessel. This is particularly useful in those cases in which one has prepared for transfusion in the pre-operative period by marking the skin overlying the vein with a dye. If the patient has suffered shock and the vessels have become contracted the needle may be placed in the tinted skin. In order to facilitate this more or less blind procedure one may use the instrument for making a hole in the skin, and in some instances the blue of the vein can be observed through the hole, especially if it is moved about. When a vein is very small, and a small needle must be used to enter it, venipuncture will be facilitated if the bevel of the needle is laid against the vein. A small vein tends to roll out from under the point of the needle while the bevel tends to flatten out the vein and one can obtain a purchase. If the vein is small and the viscosity of the intravenous solution is sufficient the flow may be very slow and the needle may be plugged. To facilitate the flow a hand-roller may be used to increase the pressure of the solution in the tube, and the rate of flow is thus increased and the administration maintained. The blood used is based on the Moss-Jansky classification of groups 1, 2, 3, and 4, in which group 4 is the universal donor and group 1 the universal recipient. When one does not have the facilities for grouping blood, then the blood should be matched, and the important thing to bear in mind is that the serum of the recipient should not agglutinate the corpuscles of the donor. The rate of injection of the blood should be about 15 c.c. per minute. If an untoward reaction develop administration should be stopped immediately. Epinephrine may be used to combat moderately severe reactions, and even morphine may be employed. Chills and fever following the administration of blood are said to be due to a minor incompatibility of blood, and, sometimes, to toxic substances in the equipment; not infrequently also they are due to too rapid administration of the blood. Occasionally, symptoms may be due to pathological conditions and not to transfusion. For example, a white woman, fifty years old, who suffered from carcinoma of the large bowel, had pleurisy with effusion, and when she was lying on her back she had some dyspnœa. At the time of transfusion she was placed on her back and, as the transfusion was given, considerable dyspnœa developed. This dyspnœa for a time was charged to the transfusion, but it was later found to have been the result of a combination of her position on the table and the condition in the chest.

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A SURVEY OF MONGOLISM, WITH A REVIEW OF ONE HUNDRED CASES*

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THE mongolian syndrome was recognized as a clinical entity by Langdon Down in 1866. The condition is not uncommon, as the Presbyterian Hospital in Chicago has given the figures of 6 mongols in a series of 3,818 births over a six-year period, and the records of the Hospital for Sick Children in Toronto over a period of sixteen years include 125 mongols out of 98,510 total admissions. Extraordinarily little is known about mongolism, its etiology, and its pathology. There are certain features that are suggestive of either thyroid or pituitary dyscrasia, particularly the former, although the evidence is contradictory, and the typical mongol presents some features characteristic of cretinism together with other features ordinarily associated with the hyperthyroid individual. The failure of the mongol to respond to glandular therapy, however, lends weight to the view that the condition is a general failure in development rather than a specific endocrine dyscrasia. Many of the usual characteristics of the mongol are common in other types of mental defectives, and, as Tredgold has said, "It is necessary to remember that mongolism consists in a peculiar combination of anomalies rather than in anomalies which are distinctive in themselves."

The typical mongolian imbecile is a short, stout, brachycephalic child. The occipito-frontal circumference is usually less than the normal, probably due to the flattened occipital region; the brow is of normal shape, in contrast to the frontal and supra-orbital recession seen in other small-headed types of aments. The eyes are slanting and widely spaced; epicanthus, nystagmus and strabismus are common. The nose is of the saddle-back type, although it is not identical with the flattened bridge of the congenital luetic. The ears are frequently lobeless. The mouth is commonly held open, and the thick grooved tongue protrudes. The hard palate is narrow and arched, and the naso-pharynx small, frequently being encroached upon by the projection forwards of one of the cervical vertebræ. The neck is short and thick. The skin is very elastic, soft and velvety in the infant, in the older mongol it becomes dry and rough. The hair tends to be straight, dry, and sparse. The extremities are short and stubby. The characteristic short skeleton of the mongol is due to this shortness of the long bones, rather than to alteration in the length of the vertebral column, and the irregularities of growth characterizing cretinism and achondroplasia are absent in the mongol. The spine tends to be straight, the normal curves developing relatively late. Muscular weakness may result in the development of dorso-lumbar kyphosis in the older child. There is a generally relaxed state of the ligaments, which, in association with the marked hypotonicity of the musculature, gives rise to an extreme degree of hyperflexibility, enabling the child to assume and rest for long periods of time in extraordinary positions. Muscular development is delayed and deficient, and such defects as umbilical hernia, cryptorchidism, patent foramen ovale, syndactylism, and Darwinian tubercles are common.

Apart from the skeletal peculiarities, to be discussed later, the hands frequently show two variations from the normal for which no adequate explanation has been offered. Penrose, in a study of 60 cases of mongolism under his care, observed that in 16 of his series there was a departure from the normal arrangement of the creases on the flexor surface of the little finger; instead of the normal three transverse creases on this finger these mongol hands showed only two, although the correct number of phalanges was present. In the anomaly described a new crease, usually double in character, takes the place of the distal and medial creases and lies between the distal and proximal interphalangeal joints. In half of the cases reported the anomaly was unilateral. Several authors have reported a somewhat similar anomaly of the palmar lines, the usual two main transverse creases being replaced by a single line. This was found in approximately half of the reported cases in which it was sought, and is said to be common also in the mixed and higher mongolian races and low caste people of Annam and Indo-China. It is also found occasionally in quite normal persons, and there is no correlation with the degree of mental development.

The osseous system shows both generally tardy development and certain specifically mongoloid features. The most constant of the latter is the peculiar deformity of the fifth finger, the mid-phalanx being shortened and the terminal phalanx bent towards the fourth finger, so that the fifth finger forms a kind of arch. This deformity may also be found as a dominant hereditary character apart from mon-

* A paper read before the Section of Pathology, Academy of Medicine, Toronto, March 26, 1935.

golism. Orel reports a family in which the curved and shortened fingers were found in four generations, affecting a woman, her son, six of his eleven children, and two offspring of one of the affected members of the third generation; one member of the family was a mongol. Typically, the mongol's thumb is also shortened, and the hand as a whole is stubby.

On account of the wide variation within normal limits of the time of appearance of the different centres of ossification it is unsafe to be dogmatic about the question of delayed skeletal development. However, there seems to be general agreement among the writers upon this topic that there is some definite retardation. Closure of the fontanelles and sutures of the skull, particularly the frontal suture, is usually delayed. Occasional evidence of slow osseous growth is seen in the appearance of extra-epiphyseal nuclei at the proximal ends of one or more of the metacarpals. The failure of these nuclei to appear in normal persons is explained osteogenetically on the ground that a proximal epiphyseal nucleus is always present in the primitive formation but that the epiphyseal line is normally reached by the ossifying diaphysis before it has time to attain to an independent formation. Occasionally there may be two isolated osseous nuclei close together in the distal ulnar epiphysis. This usually occurs between the sixth and the middle of the eighth year but has been observed radiographically in a mongolian imbecile, thirteen years of age. Pennacchietti and Fuhry both refer also to the presence of a hypercalcified border at the end of the joint cartilages, a sign which likewise exists in athyrosis. Dentition is also prone to occur after the normal time. This is particularly the case with respect to the permanent teeth, and is regarded as evidence of tardy absorption of the roots of the deciduous teeth, so that the first and second dentures coexist. Enamelization of the teeth is generally poor, with consequent early decay.

General retardation of skeletal growth and fusion is likewise seen in cretinism, as are the short thick neck, widely separated eyes, protruding tongue, deposits of fat about the neck and back, umbilical hernia, dry skin, and mental deficiency. The mongol tends to be normal in size during the first year of life and relatively short thereafter. Psychically, the mongol tends to resemble the hyper- rather than the hypo-thyroid type, being excitable and restless, and thyroid treatment does not improve the condition of the pure mongol, the chief effects of such therapy being the disappearance of fatty deposits and the increase of any malnutrition that may be present. One series of six cases is reported in which all of the patients had basal metabolic rates above the normal, but some have low basal rates, while the great majority reported are within normal limits. A few cases have been reported of mongolism coincident with definite endocrine disease. Gordon, in an article on childhood myxœdemas, stated that "Infantile myxœdema may be associated with mongolian idiocy, presenting a composite picture of both diseases. The mongolian element is present at birth, while the thyroid dyscrasia symptoms appear within a few weeks or months", and he concludes that "there is probably no relationship between the two diseases, but a coexistence of both may be present. Whatever mongolian idiocy is due to, it is not primarily nor fundamentally a form of myxœdema." Collier has reported a case of mongolism and cretinism in one family. The first child was a mongolian imbecile, the next was a dead fetus with greatly enlarged head; the third and fourth children, of the same mother but a different father, were a normal infant and then a cretin. A two year old child at St. Mary's Hospital for Children showed most of the usual features of mongolism, and also some definitely cretinoid characteristics, and was markedly improved by thyroid therapy. One case has been reported of a typical mongolian imbecile female who, at the age of 33, began to gain weight in spite of thyroid treatment, and subsequently showed the other signs characteristic of Fröhlich's syndrome.

Mentally, the majority of mongols belong to the imbecile class, Tredgold states that many are feeble-minded, a few are idiots, but of the 206 cases whose intelligence quotients are reported by Brousseau and Brainerd only 1 per cent fall into the moron class, while 61 per cent are imbeciles and 38 per cent idiots. The highest intelligence quotient in their series was 66, the lowest was 7. Barnes reported the case of a mongol boy who was able to complete a high school course. This case appears to be

unique, the highest mental age reported elsewhere is seven years. One of our series was tested psychometrically; his intelligence quotient was found to be 21. There are no characteristic sensory disturbances. Attempts to determine the sensory acuity of the mongol are severely hampered by the typical failure to fix the attention and the difficulty of making the child understand what is desired of him. Evidence of mental retardation is present from birth. The grasping reflex present in most normal new-born infants is much diminished in mongols, and ability to follow light with the eyes is late in appearing, as are the power of sitting, creeping, walking, and speech. The young infant appears somewhat apathetic; later the child becomes restless and lively, but is generally cheerful and affectionate and easily managed. There may be considerable power of mimicry, making the child appear more intelligent than he actually is.

Autopsy reports on cases of mongolism show varied and inconstant endocrine findings. Gordon reports two cases. The first, a child of fourteen months, showed cirrhosis and dysfunction of the thyroid; physiological involution of the adrenal cortex, with hypoplasia of the chromaffin substance; a normal pineal gland, save for a cyst lined by glia cells; a normal pituitary and ovary. The second was an infant of six weeks who showed similar cirrhosis and dysfunction of the thyroid; physiological involution of the adrenal cortex with chromaffin hypoplasia, retrogressive changes in Hassall's bodies with increase in number; hypoplasia of the thymic cortex; incipient atrophy of the anterior lobe of the pituitary; and a normal pineal gland. Fromm reported a patient aged 1½ years showing hypoplasia of the thyroid with advanced sclerosis, and Bernheim-Karrer noted a small atrophied and partially sclerosed thyroid and small gelatinous thymus. Of 19 autopsies from the Hospital for Sick Children records, one showed a very small thymus, microscopically normal, one showed fibrosis of the thymus and a very small thyroid; the adrenal cortex was unusually thick in one case, and in one the adrenals were macroscopically normal, but microscopic examination revealed vacuoles, probably fat, in many of the cortical cells. Pennacchietti mentions a case in which precocious involution of the thymus was found, and suggests that the thymus is an organ of antitoxic defense, and that here may lie an explanation for the abnormal susceptibility of the mongolian imbecile to respiratory and infectious diseases. He refers also to hypotrophy of the adrenal cortex as a frequent finding, and to a case in which the thyroid showed alterations similar to those found in Basedow's disease. Several cases are reported in which the thyroid showed increase of the interlobular connective tissue and shortage of colloid.

Examination of mongol brains does not show any constant pathological picture, but the brain is usually smaller and less complex than the normal of equal age. The width of the permanent cortex in mongols under one year is not abnormal, according to Hirning and Farber, but they report definite lag in growth of the permanent cortex in older mongols as compared with the normal group. The reduction in size is said to be relatively more marked with respect to the pons, medulla, and cerebellum than the cerebrum. The defective growth of the structures at the base of the brain is sufficient to account for the flattening of the posterior portion of the skull. Davidoff reports ten cases and states that the cerebellum and brain-stem are disproportionately small, the antero-posterior diameters are narrow, and the lateral diameters relatively wide, and there is, as a rule, embryonic simplicity of the convolutions with absence of secondary gyri. He further states that there is evidence of a degenerative process affecting the ganglion cells, particularly those of the third cortical layer, occurring very early in life. Marked asymmetry has been reported in many cases. Bourneville believes that there is a fibrous meningitis without any evidence of a true inflammatory condition. Babonneix suggests that there is a chronic meningitis as the primary lesion in the nervous system, and that the arrest of development is very pronounced because of the early stage of cerebral development in which the meningitis occurs. Encephalograms have shown deep subarachnoid spaces and widely separated convolutions with deep sulci, and dilated ventricles. Abnormalities of the brain are described in 5 of our series, in 4 of these it is stated that the convolutions were flattened, and in 1 the glial tissue was increased. In the fifth case there was a congenital malformation

of the left cerebellar hemisphere. In 3 cases it is definitely stated that the convolutions were well formed.

ETIOLOGY

The etiology of mongolism has been the subject of very varied and often highly imaginative theories. The ethnological theory of Down, that the condition is the result of arrest of development in a fetal period equivalent to the mongolian state, has been discredited by most writers on the subject, as have the theories that alcoholism, or what Pennacchietti refers to as "blastotoxic hereditary syphilis", *i.e.*, hereditary syphilis of the second generation, are determining factors. Mebane has reported a case of a mongol with characteristic Hutchinson teeth and a negative Wassermann test. Van der Bogert presented a case of congenital syphilis closely resembling mongolism in one of twins; the other twin was apparently normal, and the Wassermann test was negative. Doubtless it was cases such as the above that led to the attempt to find a connecting link between mongolism and congenital lues. The blood Wassermann test was done in ten of our cases; in all of these it was negative. Jansen has expounded the theory that the amniotic sac may be small and tight, causing increased pressure and excessive flexion of the fetal head. He suggests that this condition may result in anencephaly, achondroplasia, or mongolism, depending on the age of the embryo when the pressure occurs. It has been suggested that mongolism is due to diminished viability of the ova, that "in the population of ova there is continually a certain mortality rate, and in a period between that of complete viability and that of failure of reproductive function the ova pass through a mongolian-genetic stage." Herrman maintains that mongolism exhibits the behaviour of a true recessive unit because of which it may be expected to reappear in the general population from time to time, and that the mongol presents both mongolian and anthropoid characteristics, and represents reversion to a primitive type. Macklin suggests that mongolism is hereditary, due to a combination of recessive factors. The occurrence of more than one mongol in a family is rare; out of 2,526 mongols studied Macklin found only 30 such cases. One family contained 4 mongols, there were 3 cases of 3 in a family, and 26 of 2 mongols in one family. There were also three cases of mongol first cousins, one of second cousins, and one family in which a mongol child had two maternal aunts and one maternal uncle, also mongols. Herrman reports the case of a woman who had one normal child by her first husband, by a second husband she had a mongol baby, then a normal child, and another mongol. Glassburg reports a family of eleven children in which the last two were mongols. In one of our cases the mother was mentally deficient, but in none of the series was a history of other mongols in the family obtained.

There is considerable statistical evidence to indicate that the age of the mother is a factor in the production of a mongol offspring. According to Shuttleworth's figures, the greatest number of births in any age-group is to mothers of twenty-three years, while the mongol births are maximum in the forty-three year maternal age group. Jenkins states in his article on the etiology of mongolism that birth control in all females of forty or over would reduce the total birth rate by 4 per cent, and the mongol birth rate by 36 to 38 per cent. Sewell Wright has shown the possibility of maternal age as a factor in the production of congenital defects by

TABLE

Maternal Ages at Time of Mongol Birth:	*Control Series:*
1 mother aged 47 years	
1 " " 46 "	
1 " " 45 "	1 mother aged 45 years
5 mothers " 44 "	
3 " " 43 "	1 " " 43 "
1 mother " 42 "	
2 mothers " 41 "	
1 mother " 40 "	
7 mothers " 39 "	
3 " " 38 "	1 " " 38 "
4 " " 37 "	1 " " 37 "
3 " " 36 "	3 mothers " 35 "
1 mother " 35 "	
1 " " 34 "	
2 mothers " 33 "	1 mother " 33 "
3 " " 32 "	1 " " 32 "
2 " " 31 "	1 " " 31 "
1 mother " 30 "	4 mothers " 30 "
1 " " 29 "	3 " " 29 "
2 mothers " 28 "	3 " " 28 "
3 " " 27 "	6 " " 27 "
	4 " " 26 "
	2 " " 25 "
1 mother " 24 "	2 " " 24 "
1 " " 23 "	7 " " 23 "
1 " " 22 "	2 " " 22 "
	1 mother " 21 "
	4 mothers " 20 "
2 mothers " 19 "	2 " " 19 "
Total 53.	Total 50.
Average age 35.7	Average age 27.3

demonstrating a relationship between the age of the dam and the incidence of polydactylism in in-bred guinea pigs. This was apparently not wholly due to genetic factors, and could not be segregated. Von Hofe reported that in his series of 150 cases 86 per cent of the mothers were thirty or over at the time of the mongol birth; 55 per cent were 35 or over. In our series the maternal ages are known in 53 cases. As a control series 50 cases were selected at random from the records of the Hospital for Sick Children. The average age of the mothers of mongols in our series was 36 years, whereas the average mother of the normal children was aged 27 years. In the mongol series, half the mothers were 37 or over; in the control series, half were 27 or over. Twenty-eight per cent of the mongols were born to mothers of 40 or over, as compared to 4 per cent of the normal children. Mothers under 30 years of age produced 21 per cent of the mongols and 72 per cent of the normal children.

Stekloven stated that the birth of a mongol is frequently preceded by a period of diminished fecundity; that 87 per cent of normal children are born after an interval of not more than four years since the last previous child, and only 62 per cent of mongols occur after a like interval; only 1.37 per cent of normal children follow after an interval of nine or more years, whereas 12 per cent of mongols are born after such an interval. Our figures closely approximate the above. Of the cases having older siblings, among the mongols the next member of the family was at least five years older in 29 per cent of cases; in the control series only 19 per cent showed a five-year gap between the patient and the last previous child.

When mongolism occurs in dizygotic twins only one twin is affected, the other being normal; in the case of monozygotic twins both are mongols. This is a point against the theory that mongolism is due to the modification of sperm cells by toxic secretions of the female generative tract, related to the age of the mother. In explanation of the above findings with respect to twins it has been suggested that the immediate cause of mongolism may be a local pathological change in the uterine mucosa.

Stoeltzener has advanced the theory that the cause of mongolism may be maternal hypothyroidism during pregnancy, empoverishing the embryo of sufficient hormones, and two cases are cited by another author in which the mothers were young women and suffered from hypothyroidism. Clark, of Edinburgh, believes that mongolism is caused by fetal hyperthyroidism, ceasing at birth. In support of this theory he suggests that the mechanics of exophthalmos, with Moebius' sign, occurring during antenatal life and ceasing at birth, would account for the changes in and around the eyes of the mongol. These changes, cataract, epicanthus, strabismus, slanting eyes, high arched eyebrows, large orbital fissures, etc., differ from arrests of development, and therefore require a different explanation from that of general retardation. With regard to the peculiar tongue of the mongol he states, "In my view the mongol's tongue results from participation of the tongue muscles in the general muscular hypotonus, the muscles are lax and extensile, and tone being defective, the tongue gradually expands, due to oral suction. Such an organ functions defectively, and this in turn gives rise to the constant sucking movements." Pennacchietti accepts this theory, and adds "If we reduce the conditions of hyperthyroidism to a degree less than those that have been realized by physiological experience, and if we associate with these conditions a dependent hypo-evolution of organs concerned with dimensional growth, *i.e.*, the thymus, and adrenal cortex, we can easily reconstruct the pathogenesis of mongolian idiocy, which consists in a congenital somatic infantilism, with signs of precocious senility (involution of the thymus, dystrophy of the skin and teeth, hypotrophy and involution of the adrenal cortex), as dependent on a too rapid and precocious process of differentiation of the diverse structural stages, of thyroid origin." A parallel may be drawn with the findings reported by Gudernatsch, who fed tadpoles on thyroid and observed that metamorphosis was brought about prematurely, the tadpoles becoming perfect pigmy frogs; their life span was invariably brief, but even those that were kept alive for several weeks failed to show any further growth or differentiation. With regard to the suggestions of a polyglandular dyscrasia, Loeb and Friedman found that the feeding of anterior pituitary extract to guinea pigs resulted in hypertrophy of the thyroid with decrease of colloid, and that Grave's disease was simulated with respect to the changes in the thyroid and the basal metabolic rate. They also observed that the exophthalmos thus caused was functional and tended to disappear before death and in complete narcosis; similarly, one might expect a fetal tendency to exophthalmos to disappear before birth if the hyperthyroidism had ceased. In addition to Clark's explanation of his theory of fetal hyperthyroidism, it may be said that the increase of thyroid activity in the pregnant woman is well known, and that Shunkai Ujiie has shown experimentally that the placenta is permeable to the thyroid and parathyroid hormones. It is also known that insulin produced by the fetus in the later stages of pregnancy may be utilized by the mother. It remains to find some explanation for the apparent correlation between the changes in the fetus, if these are due to hyperthyroidism, and the diminished fecundity of the mothers of mongolian offspring.

The prognosis, mentally and physically, is bad. Approximately half of our series died while under observation, the average age at death being 12.6 months. In 56 per cent of the cases the cause of death was broncho-pneumonia. The next most common cause of death was congenital heart disease, 7 per cent. Cardiac and other congenital defects are extremely common. Von Hofe's series of 150 cases showed congenital cardiac defects in 9.3 per cent. Thirty-four per

cent of our series had some type of defect apart from the deformities characteristic of the condition, and 13 per cent of the cases had congenital heart lesions. The next most common defects were herniæ (exclusive of umbilical herniæ), 5 per cent, and club foot, 3 per cent. In comparison, 100 infant ward charts, selected at random showed only 2 cases of congenital heart disease and 5 other congenital defects. Thacher reports that there is no characteristic electrocardiographic abnormality associated with mongolism, as is the case in cretinism.

The outlook for the mongol is as a rule worse than for other imbeciles of his mental group, as the mongol is hampered not only by mental incapacity but also by defective muscle tone and inability to coordinate in fine manual exercises.

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LEFT VENTRICULAR FAILURE*

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IF one omits the discussion of sudden death, there remain two distinct types of cardiac failure with which the practising physician is familiar. The first of these deals not with myocardial disease, but with sclerosis of the coronary arteries resulting in deficient blood supply to the heart muscle. The myocardium may quite well be healthy, and the heart valves normal. In this type the cardinal symptom is pain. The pain may be that of angina pectoris; that is, it may occur on effort and disappear with rest, or it may be the more prolonged and severe pain of coronary thrombosis. The diagnosis of coronary sclerosis cannot be established clinically except by the occurrence of angina or coronary thrombosis, or by the demonstration of ample electrocardiographic changes. The second familiar type of cardiac failure is the so-called "congestive heart failure". This may occur when there is weakness of the myocardium as a whole, or where the right ventricle alone is at fault. Lewis, in his recent book "Diseases of the Heart", has described beautifully the symptoms and signs of this condition; namely, increasing breathlessness, engorgement of the neck veins, cyanosis, liver enlargement, and dependent œdema. The old "back-pressure" theory would have explained these occurrences by reference to insufficiency of the valves of the heart, resulting in increasing pressure in the systemic veins. Following the discredit cast upon the idea of "back-pressure", the same type of cardiac failure would for a time have been attributed to inefficiency of the left ventricle in promoting a forward flow of blood. This latter idea has also been abandoned, for we now realize that the onset of congestive failure is due neither to predominant valvular leakage nor to diminished left ventricular propulsive power (the so-called *vis a tergo*), but essentially to failure on the part of the right ventricle to drive forward into the lung circuit the blood reaching it from the venous return to the heart. The factors which throw strain upon and eventually weaken the right ventricle are increased pressure in the pulmonary circulation, resulting from mitral stenosis, or from pulmonary disease such as advanced emphysema, or from a direct load on the right ventricle in cases of pulmonary valve stenosis. More common than any of these causes of strain on the right heart, is, however, increased pulmonary pressure due directly to failure of the left ventricle, which latter subject will constitute the balance of this paper.

Isolated left ventricular failure means a weakened state of the left ventricular musculature resulting in increased pulmonary pressure,

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in the absence of increased pressure in the systemic veins. Moreover, one would anticipate that failure of this type would occur in those conditions which throw strain primarily upon the left ventricle, namely, arterial hypertension, aortic valvular disease, and coronary artery disease. In respect to the latter, it is the left ventricle which is mainly affected by coronary disease, as evidenced by the fact that myocardial infarction of the right ventricle alone is a rare event.

The conception that left ventricular failure actually occurs is not new. Reference is made to it in the literature as early as a century ago. Separate failure of the two ventricles has long been recognized in French medical literature, according to East and Bain. These authors state that the French have gone so far as to suggest that certain medicines are of more specific value in treating conditions of one ventricle than of the other. R. D. Rudolph, writing in the *University of Toronto Medical Journal* in 1924, said that in chronic heart failure it is often possible to tell which of the ventricles is at fault, and that left heart involvement is suggested by the occurrence of acute œdema of the lungs, or by the finding of gallop rhythm, or of pulsus alternans.

In his lectures in 1930, Parkinson stressed the association of hypertension and acute pulmonary œdema; and of hypertension and aortic insufficiency of luetic origin, with cardiac asthma. In 1931, Fishberg, in his paper on "Cardinal Circulatory Syndromes", outlined several salient points distinguished right from left ventricular failure. In respect to the latter, he mentions the symptoms of dyspnœa on effort, and cardiac asthma, together with the signs of increase in the loudness of the second pulmonary sound, and the occasional occurrence of gallop rhythm. More recently, White has added to the list of signs two others—the first, decreased vital capacity, and the second, x-ray evidence of engorgement of the lung hilus shadows. In White's paper the frequency of left ventricular strain is emphasized. In analyzing 400 consecutive cases of organic heart disease, he states that the greatest strain was upon the left ventricle in 64 per cent, the right ventricle in only 15 per cent, more or less equally on both ventricles in 15 per cent, and uncertain in 6 per cent. As has already been mentioned, strain upon the left ventricle will result from arterial hypertension, aortic valve disease, and coronary disease, all of which are common.

Turning now to the study of individual patients in whom strain upon the left ventricle might be expected, one should first enquire into the occurrence of undue breathlessness on exertion. In other words, does the patient suffer from cardiac dyspnœa, in the absence of mitral stenosis or other cardiac defect? This symptom is constant where left ventricular failure is present. It is wise always to recall that cardiac dyspnœa carries its fullest significance when it is an isolated symptom. By this I mean that when it is accompanied by a great many other symptoms of supposed cardiac distress one must be increasingly careful in ruling out neurocirculatory asthenia. Soma Weiss believes that in the early stages dyspnœa is produced through nervous communications between the pulmonary system and the medulla. In any event, when the pulmonary blood pressure is raised there is experimentally a reduction in the vital capacity of the lungs, with a consequent lowering of the point at which dyspnœa will be produced. Means' excellent article on "Dyspnœa" suggests this explanation.

Many patients with left ventricular failure suffer with another form of dyspnœa, one which is paroxysmal in its onset, and usually of nocturnal occurrence. This form includes cardiac asthma and acute pulmonary œdema. It is true that acute pulmonary œdema may occur in patients with mitral stenosis as a result of overaction of the right ventricle working against a much stenosed mitral valve. But the majority of such cases are due to left ventricular failure. One may readily understand how a fatigued left ventricle may lag behind a more efficient right ventricle during the hours of sleep, with resulting congestion in the pulmonary circuit, gradually increasing until the patient suddenly awakes with extreme breathlessness, or, even worse, breathlessness with superadded coughing of frothy sputum which tends to smother him. The breathlessness in these paroxysms is increased by the impossibility of proper aeration of the blood in the œdematous lungs, and the consequent accumulation of carbon dioxide in the systemic blood. In many cases the assumption of an

upright position may quiet the attack. In more severe forms morphine seems almost specific.

The signs of left ventricular failure are, as one might expect, mainly those of increased intra-pulmonary pressure. If a patient who suffers with either or both of the above types of breathlessness is examined with the fluoroscope, one frequently finds ample evidence of increase in the lung hilus shadows, indicating a chronic state of pulmonary vessel congestion. This, in the absence of systemic venous congestion, is good evidence of left ventricular failure, provided that mitral valvular disease and congenital heart disease have been ruled out. While one would not likely be fortunate enough to observe fluoroscopically the same patient during an attack of cardiac asthma or acute pulmonary œdema, a marked increase in this congestion during such attacks is not difficult to imagine.

With increased pulmonary pressure there is naturally an increase in the intensity of the second pulmonary heart sound. The loudness of this sound may be compared with that of the adjacent aortic second sound, and in this way one can determine an increase or decrease of pressure in the pulmonary circuit. This, in turn, will indicate increase or decrease in the degree of failure of the left ventricle. This simple bed-side method may prove both interesting and helpful.

Reference has already been made to vital capacity. It will be recalled that the quantity of air inhaled or exhaled in ordinary quiet breathing is termed "tidal air". If however the lungs are filled to their greatest capacity and the contained air is then exhaled to the maximum extent the amount of air expelled is termed the "vital capacity". The latter is usually about eight times as great as the tidal air. Vital capacity can be measured very simply by means of a spirometer; or, if one wishes a more conveniently portable apparatus, the flarimeter will prove an ingenious means. The vital capacity in health has been shown to be a simple function of the surface area, and hence can be determined for any individual. In left ventricular failure the vital capacity has been found to be reduced. While this observation may not be considered of great practical value there are doubtless occasional cases in which it will prove of assistance.

In addition to these signs there are two others of considerable importance which do not depend upon increase in pressure in the pulmonary circuit. The first of these is gallop rhythm. Gallop rhythm is considered present when a fairly loud, low-pitched, third heart sound is heard shortly after the second sound in the mitral area. It must be distinguished from the abnormal sounds occasionally heard in mitral stenosis and in auriculo-ventricular heart block. A palpable impulse often accompanies this third sound. It occurs usually in older people in whom factors constituting left ventricular strain are present. The palpable shock is probably due to a sudden rush of blood under pressure from the auricle into the dilated left ventricle. Not infrequently gallop rhythm will disappear under treatment, but its occurrence is usually of serious moment.

The remaining sign of left ventricular failure is pulsus alternans. Although this is most definitely recognized on a radial artery tracing, from the practical standpoint it is detected sufficiently well by means of gradually lowering the pressure in the blood-pressure cuff at the systolic level. It should be recalled that in lesser cases alternation occurs for only a few beats following an extrasystole. Because pulsus alternans is an arterial sign its origin in the left ventricle is a certainty. The usual explanation given is that a portion of the heart muscle fibres is unable to contract except with each alternate heart beat. The gravity of several of these signs is known to all of us, in particular that of gallop rhythm and pulsus alternans. The serious significance of cardiac asthma and acute pulmonary œdema is also well recognized. Obviously one would not expect any individual case of left ventricular failure to manifest all of the symptoms and signs enumerated.

TREATMENT

Treatment of patients showing left ventricular failure includes in many cases a period of complete rest in bed, followed by a permanent restriction of activity. Fishberg states that he does not find digitalis of any particular benefit in this type of failure, and that he considers rest, restriction of fluids and salt, and the occasional administration of salyrgan, to give as good results alone as with the addition of

digitalis. On the other hand, White greatly favours rest combined with continuous digitalis therapy, as offering the most satisfactory result. The action of digitalis in these cases is one of improving the contractile power of the ventricular muscle, normal rhythm as a rule being present. In support of this, Christian believes that digitalis tends to prevent cardiac hypertrophy. He states that a moderate daily dose of digitalis will retard cardiac enlargement, and delay the appearance of symptoms and signs of cardiac insufficiency. He states: "I advise patients in whom I find enlargement of the heart to decrease physical exertion and to take continuously from 1½ to 2 grains of digitalis leaves twice daily, unless this amount causes toxic symptoms, as occasionally it does. If that happens the dose is reduced to a point at which no toxic symptoms appear. Digitalis for these patients is continued throughout the remainder of life." One should note that in this quotation, Christian is not referring to cases with auricular fibrillation.

In our cases we have followed the treatment recommended by White, prescribing where necessary complete rest for one to four weeks or longer, and the administration of the equivalent of 20 to 30 minims of Tincture of Digitalis daily. In addition, symptomatic treatment should be added. As an example:—

Mrs. M., aged 65, came to the Heart Clinic of the Toronto Western Hospital, complaining that for six months she had noticed increasing breathlessness on exertion, so that she could no longer walk more than two blocks. There had been no nocturnal dyspnœa. Examination showed the pulse rate to be 90 and regular. The blood pressure was 180/110. The heart was enlarged to the left, the apex being 10 cm. from the midline in the fifth interspace. The pulmonic second sound was as loud as the accentuated aortic second sound. There was no alternation of the pulse, and no suggestion of gallop rhythm. There was no evidence of congestive heart failure. On fluoroscopic examination considerable enlargement of the left ventricle was detected. The transverse diameter of the heart was 14.0 cm. as compared with 21.5 cm. for that of the internal chest wall, as measured in a six-foot film. There was very definite engorgement of the lung hilus shadows.

This patient was kept at rest in bed for four weeks, meanwhile taking two grain doses of digitalis leaf daily. Under treatment a marked decrease in the intensity of the second pulmonary sound was noted. A second x-ray film showed that the heart's transverse diameter had decreased by 2 cm., and that the engorgement of the hilus shadows had disappeared. The patient has since reported increased exercise tolerance as the result of her treatment. She is continuing with the same dose of digitalis.

SUMMARY

In the foregoing remarks I have endeavoured to outline the means of recognizing failure of the left ventricle and the treatment necessary in these cases. Their frequent occurrence is due to the fact that cardiac failure commences in the left ventricle in the majority of cases, and we should not fail to search for it in its earliest phases. This conception of left ventricular failure I have found extremely helpful, and this has prompted me to place this subject before you.

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THE SPECIFIC TREATMENT OF LOBAR PNEUMONIA.—W. P. Belk tabulates the results obtained in the specific treatment of lobar pneumonia. These include all the reports in the American and foreign literature up to January, 1935 that lend themselves to statistical study. In table 1, pneumococcus antibody solution is seen to be definitely beneficial in type I pneumonia, less so in type II, and of little or no value in type III pneumonia. Surprisingly, it is more effective in group IV than in type I infections. In table 2, antipneumococcus serum is seen to reduce the mortality in type 1 lobar pneumonia by 40 per cent and to save ten lives per hundred cases. It is of less value in type II but of distinct benefit in types VII and VIII. Table 3 shows an average reduction in mortality of about 50 per cent, with a saving of twenty lives per hundred cases. The 78 per cent reduction in mortality in type II pneumonias, with a saving of fifty lives per hundred cases in the selected series of Cecil and Plummer, is worthy of special mention. This table illustrates the importance of beginning specific treatment as early after the onset of pneumonia as possible. Table 4 shows that some benefit doubtless results from intramuscular and subcutaneous injections of specific preparations, but this is clearly smaller than after intravenous administration. At present these substitute methods would seem to be justified only when it is impossible to use the intravenous route. Table 6 gives a summary of the incidence of reactions as recorded in the several reports. The figures are only approximate. When precautions are taken to make skin and ophthalmic tests, and to refuse serum to those with positive ophthalmic tests and also to those with a history of allergy to horses, the question of reaction appears not to be a serious one. Serums will doubtless be still further refined, with the result that reactions will be largely eliminated and larger initial doses will be possible. The demonstrated merit of specific therapy in lobar pneumonia would seem to justify its use in broncho-pneumonia and other pneumococcic infections, such as mastoiditis, thus giving it a wider field of usefulness.—*J. Am. M. Ass.*, 1935, **105**: 868.

THE RATIONALE OF MALARIAL THERAPY IN CEREBROSPINAL SYPHILIS*

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FOR years cerebrospinal lues under its various aspects, general paresis, tabes, and taboparesis, has been a dreadful disease. "Abandon hope", was all the truthful practitioner could say to the poor sufferer who consulted him. It was known that mercury, often so efficacious in treating the primary and second manifestations of lues, was of no avail. The discovery of arsenicals, salvarsan and neo-salvarsan, was hailed at first as likely to be of value, but experience soon proved that these were if anything even more ineffectual than mercury. When once syphilis had invaded the nervous system the lot of the sufferer was dark indeed.

As early as 1888 Wagner-Jauregg recognized the inadequacy of all efforts to cure this disease by drugs directly administered. He therefore began a search for some non-specific treatment for general paresis. While Gerschman's report does not specifically say so, Wagner-Jauregg's course of reasoning is fairly obvious. He was simply availing himself of what we today all recognize as a fundamental principle in medicine, namely, that with the exception of a few conditions in which we have specific treatment, the doctor does not cure diseases, the patient himself does this. All that the doctor does is to combat symptoms, to give rest, in order to build up the patient's resistance until he himself overcomes his malady. In 1888 the medical world was beginning to recognize this principle in the treatment of tuberculosis. Bock, in the University of Oslo, was preaching that even in syphilis the patient must cure himself, the rôle of the doctor being to help him raise his resistance in every way possible, by good food, fresh air, sunshine and general supporting treatment. Bock further maintained that in syphilis the excessive exhibition of drugs carried with it the danger of weakening the patient's resistance, thus allowing the disease to progress and attack systems other than the circulatory, particularly the central nervous system. All these considerations, and they cannot be too strongly stressed, must have been present in Wagner-Jauregg's mind when, confronted with this chronic disease of chronic diseases, he recognized the uselessness of making a direct or frontal attack, as it were, and cast about for some non-specific form of therapy. This is to say, he cast about for some way of creating a resistance in the patient, whereby the individual could himself arrest and cure the process.

Now it is a truism that if the body is insulted by any form of infection a resistance is nearly always built up. Wagner-Jauregg's effort therefore resolved itself into a search for some agent which would build up a resistance that would be non-specific enough to oppose not only the infecting agency but also the paresis process itself.

It would go far beyond the limits of our time to describe the thirty years of his search. He tried almost every practicable agency; erysipelas, rat-bite fever, typhoid vaccine, sodium nucleolate and many others. He produced reactions and consequent fever with all these, but achieved no results until in 1917 he inoculated 8 persons who were suffering from general paralysis with malaria, and noticed marked improvement or, rather, arrest of the process, in 6 of them. In 1918 he inoculated more patients, but unfortunately the strain of malaria used did not turn out to be benign tertian and the results were somewhat unsatisfactory. He discontinued his work for the rest of the year, but in 1919 he again secured the benign tertian strain, and during this and succeeding years inoculated patients by the thousands. The results he secured are, of course, well known, and practically the same have been obtained in all other clinics where malaria has been tried in a sufficiently large number of cases to comply with the law of averages. In round figures these results are: 20 to 25 per cent recover and are

* A paper read before the New Brunswick Medical Society, July 10, 1935, at Fredericton.

able to go back to their former vocations; another 55 to 60 per cent have the disease arrested. Instead of progressing to the indescribably dilapidated state that is, or was, so familiar to us all, the patients begin to get fat and healthy, the serological picture improves; from being extremely filthy and noisy the patients become very quiet and easy to manage, many evolving into fairly useful workers, but, and this is a point to keep in mind, they have not enough mentality left to enable them, ever again, to carry on in the outside world. There remain 15 to 20 per cent; these are apparently unimproved by the treatment and go on to death. It is among these also that we have the 5 to 10 per cent death rate which malaria entails, but remember that this so-called death rate is merely hastening of the inevitable end. I feel that if one wanted so to do the death rate in any series could be brought down to practically nothing, merely by refusing to give malaria to the desperate cases, and thus let their luetic infection bear the undivided responsibility for their death.

Now a treatment which can, even in a previously incurable process, only show a recovery rate of 20 to 25 per cent would on the face of it be nothing to get excited over, and when I tell you that in my own experience the recovery rate has in the last three years been rather less than 20 per cent, you will probably wonder when I say that I thought and still think that infection with malaria is an efficient treatment, not only for general paralysis but for cerebrospinal lues generally.

Consider the following very homely and unscientific illustration. A building is subject to a slow combustion which is steadily undermining its whole fabric. The process may go unnoticed, or, if discovered, inefficient efforts are made to put out the fire. Indeed, some of the efforts may be actually harmful. Finally, after years have elapsed, and when the structure is all but destroyed, an efficient fireman is resorted to. In spite of the fact that the building is tottering on its foundation this fireman arrests the process, leaving the edifice a ruin, it is true, but still standing and able to stand for many years. I ask you, is it fair to say that, because the structure is badly damaged, the fireman was inefficient and did not do his duty? And yet, that is precisely what we say about malaria, when we call it inefficient, simply because the patient is unable to return to active life. We forget the subject was a wreck, both mentally and physically, before its aid was called in. We forget that in spite of the advanced stage of the disease its progress has been stopped and the patient's life was saved, leaving him a mental ruin, it is true, but apparently with his luetic process arrested. Should we not rather say that the fault lay not with the treatment, but with those who neglected to call in its aid until irreparable damage had been done? Looked at from this point of view, it is not the 20 to 25 per cent of the patients returned to active life who prove the real efficiency of malaria; rather it is the 50 to 60 per cent of the advanced cases in which it stops the process, in spite of the fact that they are both mental and physical wrecks. In other words, malarial infection used soon enough would be about 70 to 80 per cent efficient.

This paper has so far been on ground which is for the most part non-controversial. I do not think many responsible clinics now doubt that infection with malaria is the most efficient treatment that we have to combat general paresis of the insane. I want, however, to go a little farther and state that I, today, believe that malaria is also of great value in other forms of cerebrospinal lues, particularly tabes. I am quite aware that its value for tabes is not at present widely admitted, and yet, I today give malarial infection to tabetic patients with more satisfaction than I do in any other type of cerebrospinal lues. In order to justify this personal belief, I have to ask you to bear with me while I introduce two case reports, shown not particularly for the results obtained but because they were among the first cases of tabes treated by me with malaria, and I have had them ever since under my personal observation:

CASE 1

Female, English, aged 39 years in 1927. This patient had been married in 1907 and divorced from her husband on statutory grounds in 1912. She married again in 1919. No pregnancies resulted from either marriage.

1924.—First symptom, loss of sex passion.

1925.—Pain in the back and unstable gait. Treatment was started with salvarsan and continued for eighteen months.

1926.—Beginning loss of bladder and sphincter control. Unsteadiness was increasing; it was impossible for her to walk in the dark, even with a cane. She could not go on the street alone. The family doctor stated that he had to go two or three times a month to give morphia for crises.

April 14, 1927.—Salvarsan was discontinued and this patient was seen by me at the request of the family

doctor. The patient was very unsteady, unable to walk, except with a cane, and then only about the house. She complained of severe pains in the legs and abdomen, some incontinence of urine, lack of sensation in the rectum, a girdle sensation below the breasts, some convergence of the eyes. The pupils were unequal and Argyll-Robertson. There was the cotton wool sensation on walking; a tabetic gait and marked Rhombergism were noted. She reeled more to the left. Mentally normal.

Cerebrospinal fluid.—The Wassermann test was negative. Cells, 9. Globulin and albumin, a slight trace. Gold curve, 0122100000.

April 25th.—A provocative dose of tryparsamide was given; L.P. one week later.

May 2nd.—Cerebrospinal fluid. Wassermann, 4 and 4; cells, 4; globulin and albumin, a slight trace; gold curve, 0112210000.

May 26th.—Inoculation with malaria, seven chills being produced. The malaria was terminated on June 15th.

July.—No pains, no incontinence; cerebrospinal fluid, 3 and 4 (remainder of the test unrecorded).

December.—Cerebrospinal fluid, Wassermann test, negative; cells, 3; albumin and globulin, slight trace; gold curve, negative. No pains, no incontinence; much better.

July, 1929.—Cerebrospinal fluid: Wassermann test, negative; cells, 3; albumin and globulin, negative; gold curve, negative. During these two years I had given her some tryparsamide and bismuth, but as she did not react very well and claimed a recurrence of pain when I did so, I discontinued the treatment. She is doing very well.

November, 1933.—The patient has not used a cane, even when walking on the street, for the past two years. Some abdominal pain is noted when she is overtired or exposed to cold. This is controlled by aspirin compound. She does all her own work and has gained weight. There is a moderate tabetic gait; slight Rhombergism; the knee-jerks are absent: the pupils react very slowly to light, but not to accommodation. On this date the blood Wassermann test was negative with both antigens; the spinal fluid Wassermann, negative with both antigens. There was no increase in globulin or albumin. A normal reduction of Fehling's solution. The cell count was 3 per c.mm.; the colloidal gold curve was negative.

CASE 2

Male, 47 years old, clerk. Past history: nothing of note, except that he was treated for syphilis from 1917 to 1927.

1925.—Unsteadiness in the limbs; some pain in head and legs.

1926.—Marked incontinence of urine and fæces. He often walked home with a cane and a crutch from work because he had an "accident" and was ashamed to get on the street-car. He was unable to wash his face, unless propped in a corner.

March 15, 1927.—The patient consulted an ophthalmologist for severe frontal headaches and was referred to me. I saw him in bed. He was very spastic; there was extreme clonus; the knee-jerks were much increased; a Babinski sign was present on both sides; he was incontinent and could only walk by holding on to the furniture. Cerebrospinal fluid: Wassermann test negative; cells, 260; albumin and globulin much increased; the gold curve was negative. The blood Wassermann test, 0 and 3.

March 26th.—A provocative dose of tryparsamide was given.

April 2nd.—Cerebrospinal fluid: Wassermann test, 2 and 2; cells, 230; albumin and globulin, much increased; gold curve, 0111000000.

I gave him malaria immediately and he was cared for at home by his family physician. He had eight chills and the malaria was terminated on May 1st.

June 23, 1927.—On this date I visited the patient at his house, and found him standing on a step-ladder, papering his apartment. There was no incontinence and most of the neurological signs had disappeared. He went back to work shortly after as a freight handler, having lost his clerking job. He was given a course or so of tryparsamide by his physician.

November 26, 1933.—I saw the patient at his home. He informed me that he had never lost a day's work since 1927. He had slight pains in his legs if the weather was damp; otherwise no pain, no headache. He had a tabetic gait and used a cane. The knee-jerks were absent. The Argyll-Robertson pupils and a slight Rhombergism were still present, but he was able to do his work, which kept him on his feet all day.

A lumbar puncture was done and the cerebrospinal fluid Wassermann test was negative; cells, 7 per c.mm.; albumin and globulin, slightly increased; the gold curve was negative.

You will note that these patients are still suffering from a certain amount of disability. Whatever apparent improvement has taken place is probably due to a utilization of what pathways remained to them. In other words, the house is pretty much the same as it was when the fire was quenched. But two facts stand out; first, the pain which was such a distressing feature was relieved, and, more important possibly than this, the progress of the disease has been stopped. These patients were not many months away from being completely bed-ridden, with death the only relief to look forward to.

While my opportunities for treating tabetics have not been nearly so numerous as those for treating paretics, yet the experiences of the eight years since these original cases were first treated make me believe that malaria will yet be recognized as having great value in this form of cerebrospinal lues. Tryparsamide is often recommended for tabes. I have reason to believe that its use is definitely contraindicated in this type of neuro-syphilis. Tryparsamide is of value in paresis, particularly in fulminating types with poor physical condition. In tabes, however, the danger of optic atrophy after its use is great. I also feel that it is of no avail in controlling the major symptom of which most patients complain, *viz.*, pain.

A pertinent fact arises out of what has already been said. If all we can hope to do by malaria is to stop the process, if damage already done cannot be repaired, it would seem our duty not to wait until the patient is desperate, not to wait until he has been disabled, before resorting to efficient treatment. In other words, early diagnosis and early treatment are imperative, if we

are to benefit those who come to us for relief. My own creed briefly stated is this. I believe a lumbar puncture should be done on every case of syphilis which is past the primary stage. If that lumbar puncture or the neurological examination should indicate that the nervous system has been affected, I believe it is my duty to advise immediate inoculation with malaria, unless there are clear contraindications. This statement may seem radical, but during the past ten years I have seen over 300 patients who all had been treated for years with either salvarsan, mercury, tryparsamide, typhoid vaccine, diathermy, intrathecal injections and various other procedures. With the single exception of tryparsamide, which in some cases of paresis did seem to be of value, I felt that these long-drawn-out courses had not only done the patient no good but in many cases had merely served to lull both doctor and patient into a false sense of security, meanwhile allowing the deadly process to go on until no hope of restoration was left. It is also worthy of note that none of these patients who had been treated so long recovered their mentality, even after infection with malaria. This was true even in cases where the disease process had to all appearances been completely arrested. The patients became fat and healthy, the serological tests became negative, but, mentally, they remained hopelessly degenerated.

THE RESULTS OF ROUTINE EXAMINATION OF TUBERCULOSIS CONTACTS

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THE literature on the examination of tuberculosis contacts reveals varying results. Most of the surveys are on the basis of tuberculin tests. Drolet[1] found that 35 per cent of children who were contacts of tuberculosis patients in the home reacted positively to tuberculin. Haywood, Moriss and Wilson[2] found 91.8 per cent of all contacts to sanatorium patients to be positive to tuberculin; 74.2 per cent of those under five years of age, and 100 per cent of those over thirty years of age. These authors, on examining the same contacts by x-ray, found active tuberculosis in 8.4 per cent, latent tuberculosis in 29.3 per cent, and no tuberculosis in 62.2 per cent. Wiesner and Smith[3] found 14.8 per cent of 336 contacts to be tuberculous. A recent survey of school children in Saskatoon showed 50 per cent positive to tuberculin among contact families, compared with 14.08 per cent in the entire group of 845.[4] In Saskatchewan, 8,786 contacts were examined in 1931-1933. Of these, 655, or 7.45 per cent, were found to have active tuberculosis.[4] In England, Turner[5] examined a group of contacts of sputum-positive cases. In those over five years of age his results were as follows:—

	Positive
170 contacts, 5-15 years of age.....	13.52 per cent
194 contacts, 15-25 years of age.....	14.92 "
116 contacts, 25-35 years of age.....	11.21 "
69 contacts, 35-45 years of age.....	11.50 "
186 contacts, 45 years of age and over...	3.77 "

The present study consists of an examination of the records of 2,534 contacts from 658 families examined at the Royal Edward Institute during the years 1925-1934. Of these, 1,172 were over fifteen years of age, and 1,362 were fifteen and under. The highest age for a "child" has been set at fifteen years. There were 1,129 males, and 1,405 females; 11.3 per cent of the males and 11.6 per cent of the females were positive.

For the purposes of this study, "positive" has been taken to mean, "showing any evidence of the presence in the body of tuberculous infection, past or present". A further division has been made into, "positive, active", "positive, quiescent", and "positive to tuberculin test only". On this basis, 973, or 38.4 per cent, of the contacts were positive. These were divided as follows:—

TABLE I.
SUMMARY OF POSITIVE CASES

	Positive to X-Ray and/or Physical Examination				*Positive to Tuberculin Test Only (Only children tested)*	
	Active		*Quiescent*			
	No.	Per cent	No.	Per cent	No.	Per cent
Over 15 (1172)	179	15.3	86	7.3	...	....
Fifteen and under (1362)	133	9.8	48	3.5	527	38.7
Total (2534).	312	12.3	134	5.3	527	20.8

A study of these figures shows that, of the children, 13.3 per cent presented evidence of disease, and 38.7 per cent, evidence of tuberculous infection without disease. Of the adults, 22.6 per cent, or more than 1 in 5, showed evidence of tuberculous disease. Since the two groups are fairly evenly divided, this would appear to contradict the opinion held by some authorities that tuberculosis is a relatively non-contagious disease for adults.

PHYSICAL EXAMINATION

Of the 973 positive cases, 331 showed positive physical signs. The remaining 642 had no physical signs, but were positive to x-ray or tuberculin test, or both. There were 48 cases with positive physical signs which were negative to the other tests. This supports the old observation that, in the search for tuberculosis, if physical examination alone is depended upon, a large number of cases will be missed, while a few will be called tuberculous who are, in fact, not tuberculous.

A summary of the relation of physical signs to x-ray examination is given in Table II.

TABLE II.

THE RELATION BETWEEN PHYSICAL AND X-RAY EXAMINATIONS

	Over 15	*15 and Under*
Physical Examination Positive X-ray Positive	118	42
Physical Examination Positive X-ray Negative	32	16
Physical Examination Negative X-ray Positive	89	125
Physical Examination Negative X-ray Negative—Total	497	
Physical Examination Negative X-ray Not done—Total	595	

TUBERCULIN TESTS (CHILDREN ONLY)

Nine hundred and eighty-six tuberculin tests were done on children, of which 650 were positive. The majority of the tests were intradermal, a few in the earlier years being von Pirquet tests. In the Mantoux tests, if a child did not react to old tuberculin, 1:1000, the test was repeated with 1:100, and also with 1:10 if necessary.

A summary of the results follows.

TABLE III.

RESULTS OF TUBERCLIN TESTS

Total Tests Done	986
Total Tests Positive	650
Total Tests Negative	336
Tuberculin Positive: Other Examinations Positive.	123
Tuberculin Positive: Other Examinations Negative	527
Tuberculin Negative: Other Examinations Positive.	8
Tuberculin Negative: Other Examinations Negative or not done	328

TABLE IV.

X-RAY EXAMINATIONS (SEE ALSO TABLE II)

Total Cases Examined by X-ray 1,514

	No.	Per cent
X-rays Positive (*a*) Active	279	18.0
(*b*) Quiescent	95	6.0
	374	24.7
X-rays Negative	1,140	75.2

NEGATIVE CASES

There were 1,561 cases pronounced negative. These were distributed as follows:—

TABLE V.

NEGATIVE CASES

(*a*) Negative to Physical Examination only (Other examinations not done)	595
(*b*) Negative to Tuberculin	336
(*c*) Negative to X-ray	630

Of these 1,561 cases, 91 were positive on re-examination from one to ten years later. This represents 5.8 per cent of the negative cases and 3.6 per cent of the total number examined. These cases were distributed as follows:—

TABLE VI.

NEGATIVE CASES WHICH LATER BECAME POSITIVE

	No.	Per cent
Negative to Physical Examination only	74	12.4
Negative to Tuberculin	5	1.5
Negative to X-ray	12	1.9

These last figures are necessarily incomplete. There are doubtless other negative cases which have later become positive, and who, for one reason or another, have not been followed up. However, so long as the original patient remains active, an effort is made to re-examine all contacts several times a year.

Comparison with a Cross Section of the General Industrial Population

In a paper presented before the joint meeting of the Canadian and American Medical Associations in June, 1935, Dr. R. Vance Ward[6] showed the results of a health survey of 3,865 industrial workers in the Province of Quebec. Since the great majority of the contacts considered in the present survey are from the families of workers, this affords an opportunity to compare a group of contacts with a group of non-contacts, living under, roughly, the same environmental conditions. (Only 3 per cent of the men and 3.1 per cent of the women in Dr. Ward's series gave a history of tuberculosis in the family).

There were 2,255 males and 1,610 females in the industrial survey. They were all adults, but 1,013 males and 1,384 females were under thirty years of age. Twenty-seven cases (0.7 per cent) showed active tuberculosis; 53 (1.4 per cent) showed inactive tuberculosis. This compares with an adult rate in the contact series of 15.3 per cent active and 7.3 per cent inactive.

Summary

1. 12.3 per cent of 2,534 tuberculosis contacts showed evidence of active tuberculosis.

2. 5.3 per cent showed evidence of inactive tuberculosis.

3. 20.8 per cent showed evidence of tuberculous infection without disease. (38.7 per cent of 1,362 children).

4. 3.6 per cent were at first negative, but later became positive.

5. The necessity of supplementing physical examination by x-ray and laboratory tests, when looking for tuberculosis, is demonstrated.

Note. It should be added that the material dealt with in this study included a period in which the work of the Institute was hampered by lack of organization. The discrepancy between the physical findings and x-ray diagnoses was due to this. Also, sputum examinations and Mantoux tests have not been a routine until the last few years and therefore were not done in all the cases reviewed.

I wish to express my gratitude to Dr. J. C. Meakins for his valuable advice in the preparation of this paper.

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WHAT ABOUT TONSILS?

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In offering this contribution to a never-ending discussion I do so more for the sake of hoping to reconcile divergent views than with the idea of adding fuel to the flames of controversy. Obviously it would be impossible, in such a brief effort as this, to refer to all the phases involved when one undertakes to discuss "tonsils". Hence my remarks will be limited to various aspects of the tonsil problem as presented in adults only. In so doing, let me rule out at once those grown-up sufferers afflicted with recurring attacks of tonsillitis, quinsy, and so forth, and restrict my observations to that vast number of adults whom we see with the so-called "silent tonsil".

The first step is the performance of a proper examination. Adequate illumination is the first requisite. The employment of an old fashioned teaspoon as a tongue depressor, with a light somewhere near the ceiling, should be a thing of the past. Pocket flash lights are available at little cost. Better still is a good headlight. The prime essential in using a headlight is *learn to keep one's own head stationary.* Wobbling spasms, momentary glances, and flickering shadows convert what should be a definite finding into guesswork.

Next comes the correct handling of a pillar retractor. Passing an opinion, without the application of a pillar retractor, as to the state of a tonsil is on a par with estimating the contents of a purse while it remains closed.

Having surmounted the preliminary difficulties, one must now be prepared to interpret

and decide upon what confronts him. Here comes the crux of the problem, because what is of significance to one may count but little with another. Yet we must have certain fundamentals to guide us, though it must never be forgotten that lack of visible, definite signs of trouble by no means exonerates a tonsil. Far from it!

However there are certain factors whose presence are indicative of infection, even though the latter be hidden from view. Probably the most important single sign—reliable in the largest percentage of cases—is redness in the tonsil or its immediate surroundings. This redness varies considerably, assuming different degrees of intensity. Sometimes it is a diffuse flush, sometimes a group of discrete hyperæmic patches, or, what is most important of all, there are fine networks of radiating blood vessels. The presence of such superfluous blood vessels can be regarded as one of the outstanding hall-marks of a persistent infection in an underlying tonsil.

Then another condition may be present that is either overlooked frequently or not recognized at all. I refer to the submerged tonsil, the bugbear of those who conduct inadequate throat examinations, and of those who make reassuring pronouncements that "there are no tonsils present". For some unknown reason there seems to be an erroneous impression among a considerable percentage of practitioners that so long as a tonsil is out of sight it is out of harm's way, whereas the reverse is more often the case.

Now, having examined the external surface of the tonsil, it becomes our duty to make a closer inspection of the tonsil itself. The crypts must be investigated. Why the crypts? Because the *essential basic cause* of chronic tonsillar disease is damage to the normal epithelium of the crypts. Such damage leads frequently to the tonsil becoming an excellent breeding place for microbes, in other words, a culture tube. Unfortunately, because of other factors involved, the ordinary bacteriological investigation of such a tonsil is not of much import. Nevertheless, one should determine as far as possible the condition of the crypts, and in so doing the best instrument at hand is the pillar retractor. Pressure, applied intelligently at different points, reveals frequently signs of hidden trouble, though not always. Naturally, if pus exudes from the crypts, the evidence should be given the same relative weight as is the rash in an infective skin condition.

But no pus nor foul debris may appear. So what are we to conclude! It is a comparatively simple thing to decide that a tonsil is infected when definite signs are present. But it is a horse of another colour to give a tonsil a clean bill of health because of lack of visible evidence.

Then what are we to consider in coming to a conclusion where the tonsil has not furnished positive clues? First of all the general history. Here is where good judgment is needed. Those over-enthusiastic knife-wielders who would enucleate every tonsil they see, and those doubting Thomases who would never disturb any tonsil must be ignored. The best rule is to follow "the middle of the road", and to act accordingly. In many instances the diagnosis of tonsillar guilt may have to be arrived at by a process of exclusion, particularly when the stigmata of undisclosed infection make their manifestations in other portions of the body.

For example, in such conditions as malnutrition of indefinable origin, toxæmia with developments such as those of the rheumatic syndrome, and various digestive disturbances, often mis-labelled functional, one may, in the absence of other demonstrable cause, accuse the tonsil of complicity. In many of those ill-defined degenerative diseases of middle life, particularly those associated with neurological symptoms, the tonsil may have an insidious relationship. Again, in some of those slowly progressing developments incidental to the oncoming decay of old age the trouble may have had its beginning in pus buried in an innocent looking tonsil.

On what grounds are such broad accusations made? The answer is that clinical experience has shown that often toxins from a diseased tonsil are distributed in such small quantities that the effects produced are indefinite rather than specific. Nonetheless, the cumulative result is there. It is the old story of dropping water wearing away a stone. Too often, in the presence of increasing fatigue, vague aches and pains, and loss of vigour and vitality, is the influence of a guilty tonsil overlooked. Hence, in evaluating its significance one must not

adhere too closely to cast-iron, straight-jacket indications, but view it with suspicion, despite its seeming inoffensiveness.

Then, of course, there are other conditions in which the influence of bad tonsils has not always received the recognition it deserves. In some instances the tonsil has not even been looked upon as a probable or possible etiological agent, although the coexistence of infection in the tonsil with some of these afflictions is too frequent to be ignored entirely. Such may be the case in various thyroid disturbances, more especially those classified as toxic. Again and again one sees badly infected tonsils in goitre cases, so much so that one is inclined to believe there is some inter-relationship between the two maladies. Lastly, there are a group of diseases in which acknowledgment of tonsillar causation in a considerable percentage of occurrences is accepted more or less generally. For example, in many chronic sinus infections beneficial results often follow removal of diseased tonsils. In persistent enlargement of cervical glands hidden tonsils may be at fault, and in numerous pulmonary complaints, especially those of a bronchitic nature, the distress may have had its inception in disordered tonsils.

However, even though we have reasons for believing that in such complaints the tonsil may be looked upon in the rôle of an abettor, we must not jump to too hasty conclusions. In the majority of instances the logical first steps to take are the usual procedures called for in each disease. But when such measures fail, when progress is not achieved, when symptoms persist, and when we have reasonable grounds for suspecting the tonsils, they should receive attention.

The question now arises "What is to be done?" It can be said safely that in the vast majority of cases non-operative manipulations do more harm than good, the final result often being that the patient is worse off than had he received no medication whatever. Enucleation is the only satisfactory method of treatment. Then why is it that there are so many divergent opinions as to the ultimate results secured by enucleation? There are several answers to this pertinent question, but reference can be made to only a few.

First of all it must be realized that tonsillectomy is performed more often than is any other operation in the whole realm of surgery. Sad to say, there have been times in the past when it seemed as though overpowering waves of operative enthusiasm, so far as tonsils were concerned, swept through our profession. As a result many unnecessary operations were enacted and over-extravagant claims made that later on turned out to be worthless. Worse still, the technical difficulties of the operation itself were regarded so lightly that countless physicians, with little or no special training, slight knowledge of local anatomy, and alarming inexperience of the hazards involved in executing manipulations in a restricted field, undertook enucleations in a wholesale manner. Hence it is not to be wondered at that a greater percentage of failures to relieve or improve the conditions for which the operation was performed followed as a matter of course. That such is the case is demonstrated by the appalling number of people who have had tonsil operations of a sort. Partial enucleation is the rule in such instances, a considerable portion of the tonsil being left *in situ*.

One untoward development of such imperfect craftsmanship has been the dissemination of the unsound doctrine that "tonsils grow again". This impression is more prevalent than is generally supposed. But, worst of all, the damage inflicted by such poor operations leads to further damage later on. Redundant scar tissue and adventitious adhesions fasten the remains of the mutilated tonsil more firmly than before, and at the same time set up irritative disturbances difficult to deal with successfully. Herein lies one of the major reasons why there are such deplorable end-results following tonsillectomy. Frequently, opponents of the benefits hoped for have ample grounds for disputing the claims of those who recommend removal of tonsils. It all simmers down to the conclusion that in many instances such differences of opinions arise from the fault of the operator rather than from the operation itself. Better no operation at all than one leaving irksome post-operative legacies. If and when the time comes that our profession will insist on just as high-class workmanship in tonsillectomies as in other surgical procedures, then will many of the contentions between the proponents for and advocates against operating be removed from the realms of controversy.

A CASE OF SPONTANEOUS PNEUMOCEPHALUS AND CEREBROSPINAL RHINORRHŒA

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THE following case of cerebrospinal rhinorrhœa with spontaneous pneumocephalus is reported because of an unusual phenomenon which was observed during the performance of a lumbar puncture by one of us (Plunkett).

REPORT OF CASE

The patient was a white man, aged fifty-four years. In 1910, at the age of twenty-nine years, he had suffered from an attack of gonorrhœa. In 1913, he had had a painless indolent sore on the penis. This had been accompanied by bilateral buboes. A physician had made a diagnosis of syphilis and had administered twelve weekly intravenous injections of arsphenamine. The local lesions had subsided, and no further symptoms had appeared. In 1925, he had married, and, in 1928, his wife's only pregnancy had resulted in a healthy child.

The patient's mental symptoms had appeared rather suddenly at the close of 1929. For many years he had been working efficiently as a mail carrier. During the Christmas rush of 1929 his mail route was changed, and he found that he was not able to learn the new route. He became nervous, "jumpy", and restless. He made many blunders in sorting and delivering mail, and finally lost confidence in his ability to work and sat around the house. He deteriorated so rapidly that when he came to The Mayo Clinic on February 21, 1930, it was necessary for his wife to give most of the history.

He complained of nervousness, difficulty in speaking, vague paresthesias, and impaired control of the bladder. The general examination, including roentgenological examination of the chest, urinalysis, and blood counts, did not reveal any significant abnormality. There was, however, a marked mental slowing and depression. Speech was difficult and much slurred. The pupillary response to light was diminished. The abdominal reflexes were absent, and the tendon reflexes were approximately normal. The serological reactions of both blood and spinal fluid were strongly positive for syphilis. The spinal fluid disclosed a second zone colloidal gold curve, and contained 134 lymphocytes per c.mm. A diagnosis was made of combined interstitial and parenchymatous syphilis of the central nervous system. The patient was inoculated with malaria, and had a course of fifteen chills. His immediate response was good. He became clearer and more alert, but his former apathy was replaced by a constant fear of impending insanity or disaster and by a feeling of unreality.

During the next three years the patient received three courses of tryparsamide (each course consisting of nine doses of 2 to 3 c.c., intravenously) combined with potassium bismuth tartrate (nine intramuscular injections of 2 gm. in each course). He returned to the clinic at intervals for examination (October 4, 1930; April 22, 1931; October 23, 1931; June 27, 1932; and March 26, 1934). Repeated examination of the spinal fluid disclosed a disappearance of the leukocytosis and a gradual reduction in the strength of the serological reactions for syphilis. The patient's mental state cleared sufficiently that he was repeatedly encouraged to go back to work. His continued emotional dejection, inertia, and sense of incompetence, however, prevented him from resuming his occupation.

His condition was essentially unchanged when he was reexamined at the clinic at the end of March, 1934. During the next two months, however, he deteriorated very rapidly. When he was brought back to the clinic early in May, his mental deterioration was so extreme that his relatives were advised to take him to the Rochester State Hospital at once without further examination. When his wife was later interviewed about the subsequent findings, she said that he had never had any nasal operation or any symptoms referable to the nose. She denied that there had been any attempt at suicide or any trauma, except a slight fall a week previous to his admission to the hospital.

The patient was admitted to Rochester State Hospital on May 5, 1934. His mental state was such that no information could be obtained from him. He was somewhat emaciated and was too unsteady to walk alone. He did not appear critically ill, however. There was no evidence of any recent injury except for a small bruise on the left arm. Physical examination of the heart, lungs, and abdomen revealed no significant abnormalities. The patient's pupils were contracted and reacted only slightly to light. There was no choked disk. Sensations seemed normal so far as they could be tested. The tendon-reflexes were diminished, but they were present. The neck was not stiff. Incontinence of urine and fæces was present. The patient was disoriented and utterly apathetic. When asked a question he would occasionally respond after a long interval, but usually only with a few irrelevant words. No definite delusions or hallucinations could be elicited. The Kolmer reaction of the blood was negative and the Kline reaction was doubtful.

On May 7th, when he was out of bed for a lumbar puncture the nurse noted a copious discharge of watery fluid from his nose, but failed to report the observation. He was brought to the operating room where one of us (Plunkett) performed a lumbar puncture. This was done with the patient in the lateral position. The needle was inserted between the third and fourth lumbar vertebræ. When the stylet was withdrawn no fluid appeared. Instead, a whistling or hissing sound was heard at the needle. The needle was withdrawn and inserted in the next higher interspace. This time the attention of everyone in the operating room was requested as the stylet was withdrawn. The hissing sound of air passing through the needle was heard throughout the room. Close observation seemed to indicate that air was entering rather than leaving the needle. The same phenomenon was observed for a third time on making the puncture in the interspace between the fourth and fifth lumbar vertebræ, and, since three attempts to obtain spinal fluid had failed, the patient was ordered back to bed. When he was raised to an upright position, to step down from the table, a large amount of clear fluid issued from his nostrils. A large damp spot was also observed on the

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pillow where his head had rested. The diagnosis of cerebrospinal rhinorrhœa was, of course, rather evident.

The patient's condition still did not seem at all alarming. The following afternoon, he was taken to the roentgenological department for a roentgenogram of the head. Lateral and anteroposterior roentgenograms revealed that the ventricles and subarachnoid spaces were completely filled with air and dilated. The roentgenograms presented the appearance of an encephalogram. In the region of the base of the sphenoid bone there was an anomalous appearance, which suggested a fracture of the skull (Fig. 1). As the patient was lifted from the table to his stretcher he suddenly vomited, made a few convulsive movements, and ceased to breathe. He was dead before he could be got back to the ward (2.40 p.m., May 8, 1934).

At necropsy, the general viscera revealed practically no pathological conditions except very moderate arteriosclerosis, and a slight œdema and congestion of the lungs, with a few small areas of beginning bronchopneumonia. Removal of the calvarium confirmed the diagnosis of pneumocephalus. The convolutions of the cerebrum were atrophied, and, particularly over the frontal lobes, were covered with a greenish-yellow exudate from which a pure strain of hæmolytic streptococcus was cultured. The anterior inferior surface of the right frontal lobe was loosely adherent to the body of the sphenoid bone, occluding a hole which opened into the nasopharynx. Upon sectioning the brain, a recent abscess, 2 cm. in diameter, was discovered in the right frontal lobe near the attachment to the sphenoid bone (Fig. 3). The ventricles, which were moderately dilated, were filled with air. The floor of the fourth ventricle showed ependymitis *en plaque*.

The hole in the base of the skull was just posterior to the cribriform plate of the ethmoid bone. It was nearly circular and about 12 mm. in diameter. Its edges were smooth and rounded, and no cracks extended from the borders of the hole into the surrounding bone (Fig. 2). The posterior portion of the nasal septum, the partitions of the sphenoid and ethmoid sinuses, and the medial wall of the left antrum were absent, converting these compartments into one large chamber, which was lined with necrotic membrane. A granular calcified plaque was found in the dura, just posterior to the sella turcica.

Microscopic sections of the tissue bordering the hole in the skull failed to reveal the cause of the lesion of the bone. They showed a necrotic pseudomembrane, which covered the surface, and a non-specific chronic inflammation of the deeper tissues. Special stains failed to demonstrate spirochætes, and the histological picture was not characteristic of either syphilis or tuberculosis. No evidence of any neoplasm was found, and there was nothing to suggest a nasal myiasis.

COMMENT

We believe this is the first case to be reported in which air has been observed to enter through a lumbar puncture needle and produce a spontaneous pneumocephalus. What amounted to an accidental encephalogram resulted in this case. It is interesting to speculate on the mechanism which might have operated to bring about a negative pressure within the spinal subarachnoid space. With the patient in the lateral position and the head rotated so that the forehead was low, the cerebrospinal fluid system was in a favourable position to empty itself through the nose. This is what, in fact, did occur, immediately on a readjustment of pressure incident to the introduction of the spinal puncture needle. Under similar conditions, we believe this would almost invariably occur. The essential factor would appear to be a free pathway between the space containing the cerebrospinal fluid and the cavity of the nose. In the case reported, we have no way of knowing that air was not present within the cranial cavity before the insertion of the needle. Respecting pneumocephalus, Dandy[4] said: "A cerebrospinal fistula is probably the sign of greatest significance. Its presence should always make one suspect pneumocephalus. When sneezing follows a frontal fracture with rhinorrhœa the suspicion grows stronger, but when sneezing is followed by a flow of cerebrospinal fluid, one could almost be safe in making a

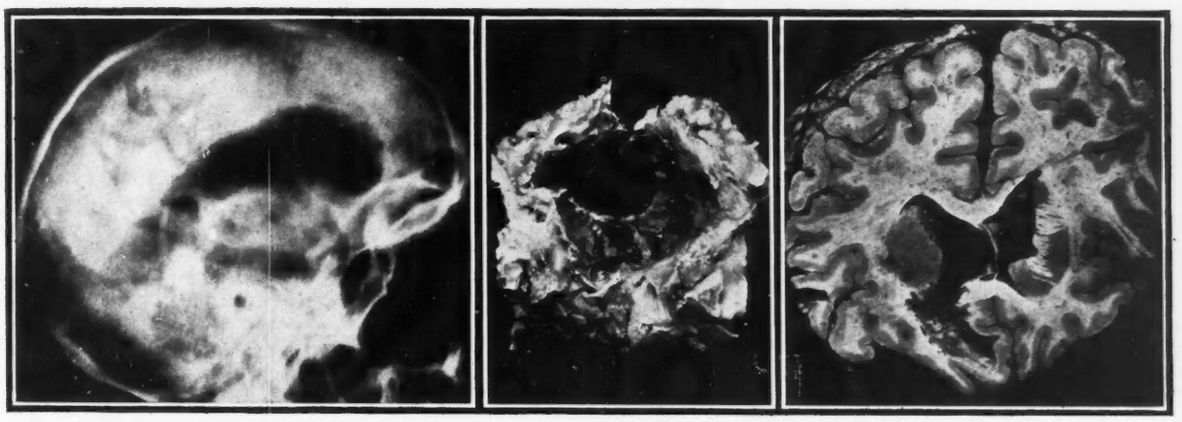

FIG. 1 FIG. 2 FIG. 3

FIG. 1.—Lateral roentgenogram of skull showing air in ventricles and subarachnoid space.
FIG. 2.—Anterior cranial fossa showing communication with nasal cavity.
FIG. 3.—Cross section through frontal lobes of brain, showing fistulous tract.

positive diagnosis of pneumocephalus without the roentgen ray.''

In the usual case of traumatic pneumocephalus a communication exists between the cavity of the nose and the subarachnoid space, through fractured bone and torn membranes. It is believed that a valve-like action of the latter serves to retain within the cranium air which has been forced there during periods of increased intranasal pressure, such as occur at the time of sneezing. In our case the cerebrospinal fluid simply passed out through the existing fistula, under the influence of gravity, when the factor of atmospheric pressure had been removed by the insertion of the spinal puncture needle.

Previous to 1913 but one case in which air was found within the cranial cavity had been reported in the literature. This is the case reported by Chiari in 1884, who found a pocket of air in the brain at necropsy. This pocket communicated with the anterior horn of the lateral ventricle and with the labyrinth of the ethmoid bone. The radiological era begins with the observation by Luckett[8] in 1913 of evidence of air in the intracranial cavity of a man who had suffered a fracture of the frontal bone which had involved the frontal sinus. In 1926, Dandy[4] collected 25 cases from the literature and added 3 of his own. The most comprehensive and recent review is that of Worms, Didiée, and Grumbach,[12] who were able to collect 72 cases from the literature up to 1932. We have been able to find additional cases, which have been reported by Allen, Bielschowsky, Bier, Bromberg,[1] Brunschweiler,[2] Campbell, Dandy,[4] Geber, Grey,[5] Guttman,[6] Jansson, Keschner and Lander, Lewis,[7] Lippens, McKinney, Nessa, Richards, Rychlik, Skoog,[9] Taft, Thompson and Reed,[10] Uffenorde, and Urech.[11] One other case of spontaneous pneumocephalus, in addition to that which we are reporting, has been seen at The Mayo Clinic.

The cases which we have been able to collect may be grouped as follows:

		Number of cases
I.	*Etiology*	
	Accidental trauma	87
	Operative trauma	4
	Infection	7
	Welch's bacillus 2	
	Otogenic 3	
	Syphilis 2	
	Tumour	1
	Unknown	2
	Total	101
II.	*Situation of air*	
	Extracerebral	26
	Intracerebral	54
	Ventricular	25
	Unstated	4
	Total	109*
III.	*Results*	
	Died	28
	Recovered	65
	Unknown	8
	Total	101

* Air being present in more than one place in some instances.

SUMMARY

1. A case of spontaneous pneumocephalus is reported, in which air could be heard entering the needle with a hissing sound during spinal puncture.

2. The unusual necropsy findings in this case are presented.

3. The mechanism involved is briefly commented on.

4. A very brief review of 99 other cases from the literature is added.

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PAPILLARY CARCINOMA OF THE RENAL PELVIS*

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A DISCUSSION of papillary carcinoma of the renal pelvis brings to our attention the importance of the single complaint of hæmaturia, and its call to the profession for immediate diagnosis. This fact cannot be too thoroughly emphasized when we consider that the relatively rare condition of benign papilloma is at present regarded as only a precursor to what later may be a highly malignant condition. So often is the hæmaturia intermittent in character that one is frequently lulled into a sense of false security by the discontinuance of bleeding, while deeply seated lesions are allowed to continue their development.

Scholl, in 1924, reported 13 primary epitheliomata of the renal pelvis in a series of 273 cases; Hunt (Mayo's) among 318 malignant tumours removed during a 17 year period found 23, or 7.2 per cent. The European writers have found the incidence to be much lower, Israel reporting 3.4 per cent in his series of 125 renal tumours. In an analysis of renal tumours by Bothe, who collected a total of 2,486 up to 1929, it was found that 142 of these involved the renal pelvis, or 5.9 per cent. Males seem to be more prone to this condition than females, the ratio being 3 to 1. The majority of the cases reported are in the sixth decade; the youngest that of a boy of 11 years, and the oldest a male of 65.

None of the existing theories as to the origin of these tumours has been proved or generally accepted. The theory of implantation seems to hold the interest of the majority. The European writers, particularly Israel and Albarran, and Hunt, in America, seem to favour this idea. Hunt is radical in the surgical treatment, since he advocates nephrectomy, ureterectomy and partial cystectomy in cases of diffuse papillary growth, apparently malignant, and his stand seems justified, since Broders has demonstrated the same degree of malignancy in the transplants lower down the urinary tract as in the original tumour of the pelvis. Other European writers disregard the implantation theory, since the products of the tumour mass which find a course down the urinary tract are of squamous cell type, and not the typical epithelial cells found in the deeper layers of the mucosa, which are capable of rapid division and rapid growth. For that reason they favour the view that the origin is inflammatory, but since it is noted clinically in the vast majority of these cases that the urine is free from the products of inflammation this theory seems hardly reasonable.

In all the cases reviewed, with one exception, the cardinal symptom has been hæmaturia. The exceptional case is one of papillary cystadenoma reported by Judd. The hæmaturia is intermittent in character, in some cases very moderate in amount; in others so marked that a severe anæmia can result. Pain in the kidney region and along the course of the ureter, of a colicky type, is also a fairly constant symptom, but apparently only at times when the hæmaturia is so severe that large clots are causing obstruction. Obstruction to the progress of the urine may also be due to degenerated portions of the tumour mass in the pelvis blocking the ureter, or to secondary transplants in the ureter itself. Failure to palpate a large kidney is not an uncommon feature. The presence of a large renal mass is more likely to be indicative of advanced disease, and in that instance due to the combined effects of tumour growth, obstruction to urination, hydronephrosis, or, perhaps more correctly, hæmonephrosis.

As is usual in all cases of hæmaturia, thorough investigation of the urinary tract is essential, utilizing all the methods of diagnostic procedure available, such as, history and physical examination, cystoscopy, laboratory investigation, and pyelo-ureterograms. Rathbun has stated that only in a small percentage of cases of hæmaturia is the term "essential" justified. In one of the cases reviewed, in which the patient had severe hæmaturia, the term "essential" seemed justified. However, it was not until the kidney had been sectioned by the pathologist following nephrectomy, that a small papillary growth was

* Read before the first meeting of the Western New York and Ontario Branch of the American Urological Association, Toronto, October 13, 1934.

discovered in one calyx—the only source of the hæmaturia. This will illustrate the difficulties encountered in diagnosis in some of these cases. The common conditions giving rise to hæmaturia must first be eliminated, such as, calculus, tuberculosis and infection.

Pyelography is an absolute necessity, since the filling defect in the kidney pelvis is so characteristic. Israel points out, however, that there are conditions which can simulate papillary growth of the renal pelvis, and lead to confusion in diagnosis, and for this reason he recommends repeated pyelograms to see whether the filling defect is constant. The conditions enumerated by him are as follows: (1) solid tumours of the renal pelvis; (2) non-opaque calculus; (3) spasm of a single calyx and filling of the remaining calyces; (4) hypertrophic renal papilla; (5) blood clot in the pelvis.

the bleeding arises, and to note the amount of concentration of dye from each kidney.

Thus the salient features in diagnosis of papillary growths of the renal pelvis are: (1) hæmaturia; (2) the presence of a tumour mass in either renal area; (3) colicky pain in either renal area, and along the course of the ureter; (4) a filling defect in the pyelogram; (5) observation of the source of the bleeding; (6) the split kidney concentration test.

As has already been pointed out the urinary sediment is usually free of inflammatory products.

The treatment in all cases is surgical, the extent of the procedure being dependent on the findings in each case. Nephrectomy alone may suffice. If, however, the so-called transplants are present in the ureter and bladder, ureterectomy is necessarily resorted to, with later

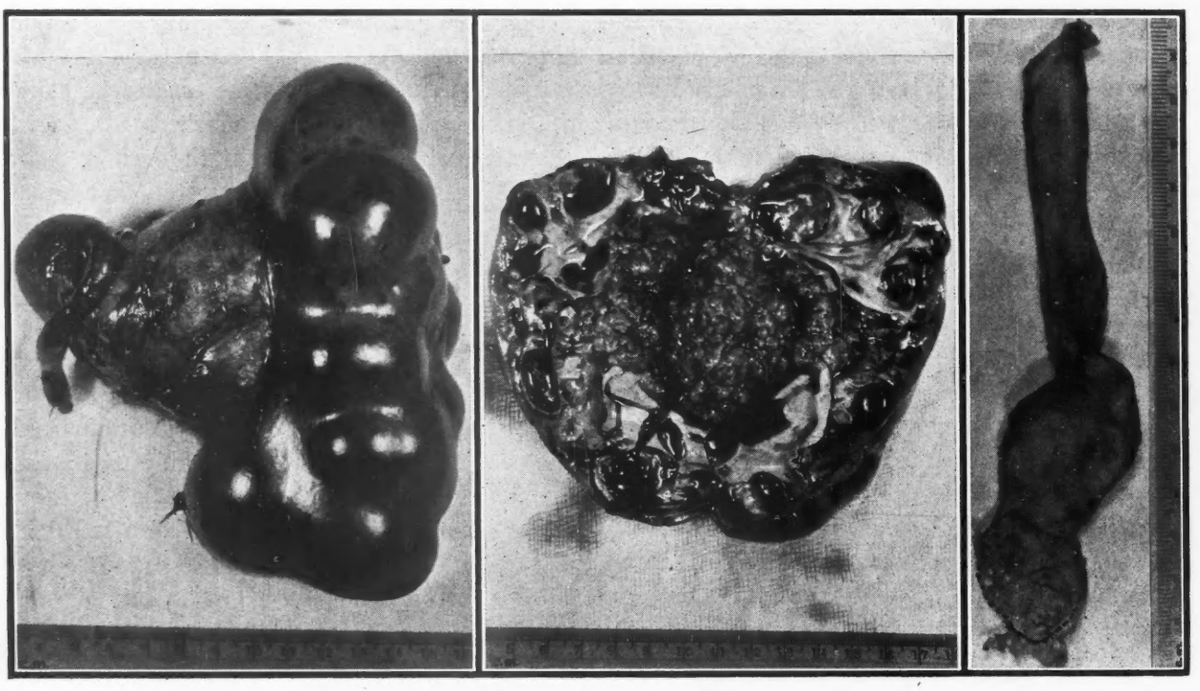

FIG. 1 FIG. 2 FIG. 3

FIG. 1.—Kidney following removal. Note the large renal pelvis and distended kidney, which was filled with blood. FIG. 2.—The kidney in section. Pelvis occupied by large papillary carcinoma. FIG. 3.—The left ureter, with "transplant" at the lower end.

During the x-ray procedure the ureter should be visualized to detect the presence of transplants from the original tumour site in the renal pelvis.

Cystoscopy should be done primarily to detect transplants in the bladder wall, not only as a diagnostic means but also to determine the extent of surgical interference required later on. It is also necessary to determine from which side fulguration of the transplants in the bladder. Treatment must be thorough in order to avoid hepatic and pulmonary metastases.

CASE REPORT

J.M., a white male, aged 56, painter, married, was admitted to hospital with a diagnosis of chronic appendicitis and right inguinal hernia. His *complaints* on admission were pain in the lower right quadrant, not referred; gaseous eructions and bloating, of three years' duration; intermittent hæmaturia, burning and smarting

on urination; urinary urgency and nocturia of two years' duration.

Previous operations and illnesses.—A soft tumour had been removed from the left breast eight years previously; a similar type of tumour removed from right breast three years previously. He had sustained an injury in infancy, resulting in a deformity of the chest and spine. No other illnesses.

Physical examination revealed an elderly white male, thin and emaciated, not acutely ill. The head, ears, and nose were negative. The pupillary reflexes were normal. A few carious teeth were present. There was a deformity of the chest, consisting of a prominence of the left anterior wall and of the right posterior chest wall — kypho-scoliosis of the thoracic vertebræ. There were well healed scars over both breasts.

Lungs.—A few wheezy râles were heard over the entire chest. Percussion was impaired over both apices posteriorly.

Heart.—The heart was displaced to the right by the lateral compression of the rib deformity; regular in rhythm and rate; the sounds were of good quality. The vessels were moderately sclerosed. Blood pressure 140/70.

Abdomen.—Soft, no rigidity. There was tenderness to deep palpation over McBurney's point. Just below and to the left of the umbilicus there was a soft palpable mass, 5 c.m. in breadth, movable, and not tender. Both inguinal rings were relaxed and impulses were felt on coughing. The rectal sphincter was of good tone; no hæmorrhoids, polyps or masses were felt. The prostate was broader than normal; median notch and groove shallow. The surface was smooth and of normal consistency.

Cystoscopy.—The bladder mucous membrane showed a mild generalized cystitis. There was a moderate enlargement of the middle lobe of the prostate. The ureteral openings were in normal position. The right was stenosed; an obstruction to the catheter was encountered at the middle third, which was overcome. The left could not be catheterized beyond the intramural portion. There was gross hæmaturia from the left orifice. Cystoscopy was repeated on three occasions with a repetition of the findings. Observation of the ureteral openings after intravenous indigo carmine showed efflux from the right side in five minutes, with good concentration; no efflux from the left after twenty minutes' observation. Skiodan films showed the right pelvis and ureter within the range of normal; the left kidney and pelvis were not visualized. Skiodan was repeated one week later, with the same findings.

Gastro-intestinal series. — Showed no abnormality other than findings indicative of chronic appendicitis. Chest skiagram. — There was marked scoliosis of the dorsal spine, the point of greatest deviation at the level of the seventh rib. There were no areas of infiltration or consolidation.

Gross phthalein test.—First hour 40, second hour 19; total, 59 per cent.

Urinalysis.—Specific gravity 1015, reaction, acid; a trace of albumin; no sugar; microscopically, 50 red blood cells.

Blood examination.—Hæmoglobin 64 per cent; red blood cells 4,270,000; white blood cells 9,350; polymorphonuclears 63 per cent; eosinophiles 3 per cent; monocytes 5 per cent; lymphocytes 29 per cent; glucose 125; non-protein nitrogen 31; chlorides 471; calcium 89. Blood type 2. Coagulation time four minutes. The Wassermann test was negative. Urine concentration test: 1022, 1024, 1030.

Left nephrectomy was performed on a diagnosis of left renal tumour on December 4, 1933, under spinal anæsthesia.

Pathological report.—The kidney on being opened was found to contain a large quantity of blood. The cortex presented a number of bassæ, while the pelvis bulged outward. Upon section the calyces were seen to be greatly dilated; the medulla appeared to be replaced by dilated spaces filled with sanguineous fluid. The cortex was thinned and apparently contained increased fibrous tissue. The pelvis contained a large sessile cauliflower papilloma measuring 5.5 c.m. in diameter, and having a base 5 by 3.5 c.m.

Microscopic appearance. — The tubular epithelium was largely lost, the interstitial tissue showing increase in fibrous tissue and a good deal of lymphocytic infiltration. The cortex showed marked pressure atrophy with many hyalinized glomeruli and dense diffuse lymphocytic and large round cell infiltrations and increase in fibrous tissue. The new growth was limited by a thick fibrous capsule at the base. It was made up of cords of cells resembling squamous cells in type, growing diffusely and arranged in papillary architecture. The cells were large and somewhat undifferentiated, rather uniform in type, and contained a moderate number of mitotic figures. *Diagnosis.*—Papillary carcinoma of the renal pelvis.

Ureter.—At the lower end of the ureter was a transplant which corresponded microscopically to the structure of the tumour in the renal pelvis.

SUMMARY

1. A report of a case of papillary carcinoma of the renal pelvis with involvement of the ureter is presented.

2. Attention is again called to the importance of the cardinal symptom of hæmaturia.

3. Thoroughness of investigation is emphasized, in order that the difficulties of diagnosis may be overcome.

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ON THE FREQUENCY OF NERVOUS LESIONS OF THE VERMIFORM APPENDIX: "NEURO-APPENDICOPATHY"*

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SINCE the publications of Masson[1] on the nervous lesions of the vermiform appendix very few clinicians have made any attempt to correlate their clinical findings in cases diagnosed "appendicitis" with the lesions described by that author.

The clinical diagnosis "chronic appendicitis", so often made, carries with it no definite underlying pathological conception, yet such a diagnosis too often satisfies the clinician. Least of all, as a rule, does the clinician who makes such a diagnosis consider the importance of nervous lesions of the organ as the basis for the clinical symptoms present. It has been thought that such lesions were of interest only to embryologist and pathologist. In Masson's first publication reference was made to Stoltz who had gathered together a few cases and tried to construct a symptomatology based upon neuro-appendicopathy. Sooner or later, we believe, nervous lesions of the appendix will be considered the most important cause of clinical signs and symptoms referable to the right iliac fossa.

Taking into consideration the frequency of nervous lesions of the appendix that we had pointed out to him, Bourgeois,[2] in 1932, reported the end-results of operations for "chronic appendicitis" and summarized the attitude of the surgeon to symptoms referable to the right abdomen. Hosoi,[3] in 1933, pointed out the frequency of the nervous lesions of the appendix and gave statistics of a few hundred cases. I feel, however, that he did not lay stress enough on the hyperplasia of the mucosal nerves and its association with argentaffin cells.

Notwithstanding the collaboration asked for by Masson, apart from these publications clinicians generally seem to have remained indifferent to the pathological lesions described by him, the description of which we think is one of the most important studies on the nervous system of the appendix. Masson's findings have been confirmed by Oberndorfer,[4] Rössle[5] and Schack.[6] One of the reasons why these lesions are not appreciated is due to the antiquated method of staining with hæmatoxylin-eosin. This stain will not reveal them. If the trichrome method of staining combined with the Fontana method is used these nervous lesions will be made clear.

In order to demonstrate the frequency of the nervous lesions of the appendix we have correlated the pathological and clinical diagnoses of the appendices removed surgically at Notre Dame Hospital during the five years, 1927-1931.

Before discussing the statistics, it may be useful to recall, briefly, Masson's most important findings.

The cells at the tip of the Lieberkuhn glands multiply and form a bud which penetrates the nerves of the periglandular plexus, but never the connective tissue of the mucosa. Whilst the bud elongates and separates from the tip of the gland the protoplasm of these migrating cells becomes loaded with chromaffin, silver-reducing, granules, similar to those of normal Kulchitzky cells, or Masson's argentaffin cells. On the separation of these buds from the epithelium of the crypts, the argentaffin cells may remain in the vicinity of the gland. (Fig. 1). More often they continue their migration, isolate themselves one from the other, extend along the nerves of the mucuous plexus, and sometimes reach the plexus of the submucosa. Blocked at the interlacings of the plexuses, they pile up and arrange themselves to form rosettes around a central cavity containing secretion.

The presence of argentaffin cells in the nervous plexus provokes a hyperplasia of the nerves. This hyperplasia is sometimes diffuse, involving the whole sub-glandular plexus, and sometimes localized, forming a small neuroma which pushes aside the muscularis mucosæ. (Fig. 2). These neuromas persist as long as they contain argentaffin cells. When these cells disappear, the neuromas undergo atrophy and are invaded by lymphoid cells.

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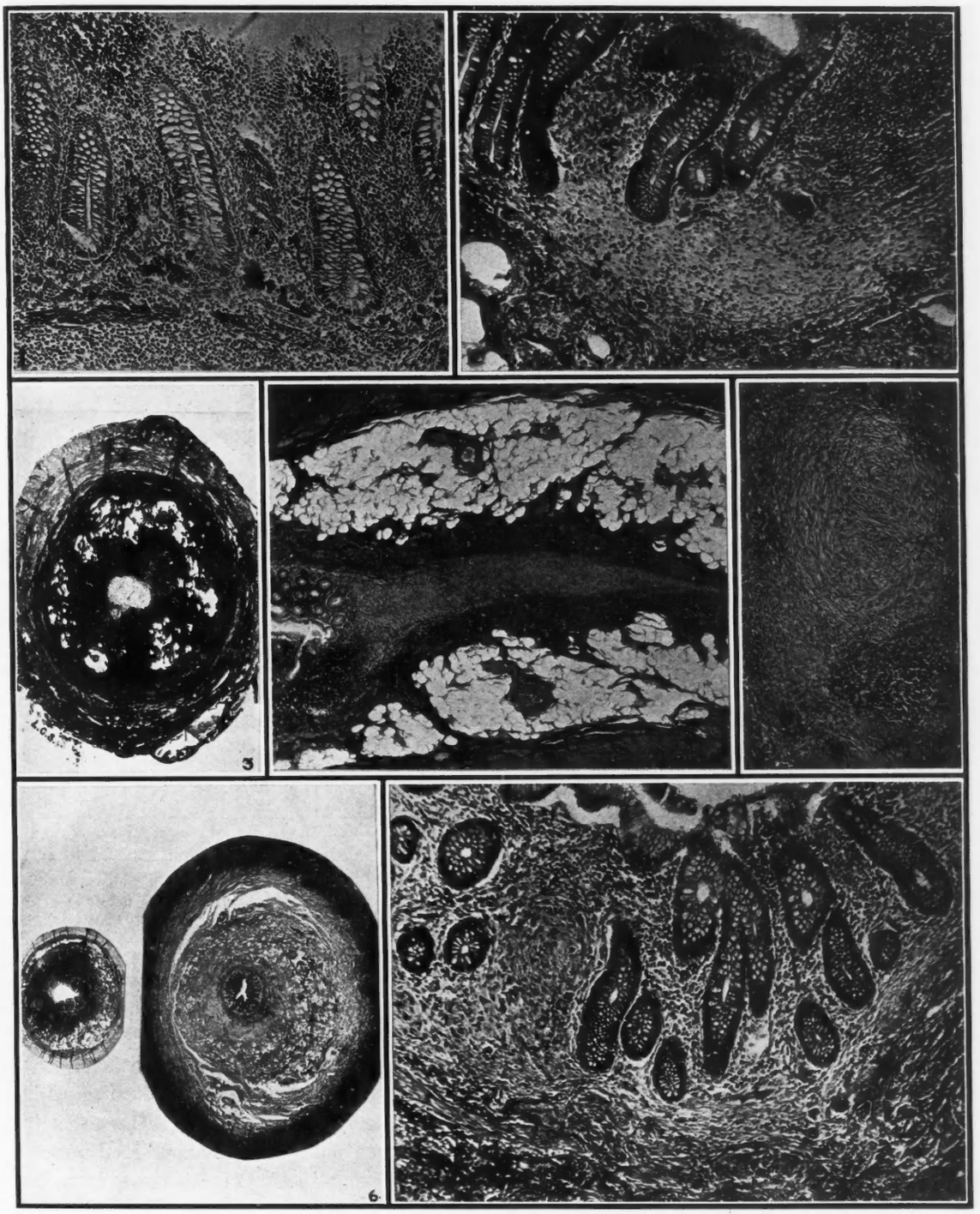

FIG. 1.—Appendix, male, 23 years. Ammoniated silver nitrate. Numerous argentaffin cells isolated or grouped in the subglandular tissue. FIG. 2.—Intramucous argentaffin cell neuroma forming a clear mass between the tips of the crypts and the muscularis mucosæ which is crowded into the submucosa (after Masson). FIG. 3.—Obliterated appendix, in cross section, centred by a neuroma appearing as a clear mass in the axis (Trichrome blue). FIG. 4.—Obliterated appendix, in longitudinal section. To the left, the end of the lumen. In the axis of the appendix in continuity with the subglandular tissue is a long neuroma, triangular in shape, extending towards the tip of the organ (Trichrome blue, after Masson). FIG. 5.—Large axial neuroma in an obliterated appendix. Note the clear appearance of the neuroma as differentiated from the surrounding connective tissue (after Masson). FIG. 6.—These two appendices have been photographed with the same magnification to show the differences between a normal appendix (left) and an appendix affected by hyperplasia of the musculo-nervous complex (after Masson). FIG. 7.—Association in the same region of the mucosa of a small argentaffin cell neuroma (below), and a pendulum-shaped neuroma connected with hyperplasia of the musculo-nervous complex of the submucosa (after Masson).

Simple neuromas may be seen in the axis of spontaneously obliterated appendices. (Figs. 3, 4, 5). These axial neuromas are generally interpreted under the microscope as cicatricial tissue.

In certain cases, the migrated argentaffin cells multiply, invade the different nervous plexuses and then the connective tissue, while at the same time an abundant muscular stroma is being developed. By this process there is evolved that special tumour called "carcinoid" by Oberndorfer.

In all these lesions the changes of the nerves are always associated with the presence of argentaffin cells. In the so-called "carcinoid" the argentaffin cells predominate. All these features — migrating argentaffin cells, hyperplasia of the nerves, and intramucous or axial neuromas containing argentaffin cells— are provoked by mild attacks of appendicitis, to which Masson has given the name of "neurogenic appendicitis".

Still other lesions of the appendix are described by Masson. These concern the sympathetic nervous system and the muscular apparatus. This ensemble of lesions Masson calls "musculo-nervous hyperplasia of the appendix". In this condition the appendix is enlarged, sometimes greatly, (Fig. 6); the follicular apparatus tends to disappear; the muscularis mucosæ undergoes hyperplasia, is thickened and, in a cross section of the organ, forms a regular circle; in the lower part of the villi, between the glands, multiple small neuromas are seen (Fig. 7); the circular muscular coat is also thickened. Some muscular fibres may be seen, even in the medial part of the submucosa interlaced with large hyperplastic nerve fibres. "Neurogenic appendicitis" and "musculo-nervous hyperplasia of the appendix" may be present in the same specimen.

The material for microscopical study in this investigation was selected and prepared according to the routine of the laboratory. This was as follows. Three blocks of tissue, obtained by cross section, were taken from each appendix, one from near the tip, another from the middle, and the third from near the proximal end. A few obliterated appendices were cut longitudinally. The following stains were used: hemalaun-erythrosine and saffron as a routine method of staining, and iron-hæmatoxylin—(Ponceau) or fuchsin—aniline blue, as indicated. The ammoniated-silver reducing method of Masson, while useful, is not necessary for the recognition of argentaffin cells. After trichrome staining these cells may be easily seen in the nerves by anyone who has a little experience.

CHART I

	CHRONIC APPENDICITIS				ACUTE APPENDICITIS					APPENDICES REMOVED DURING LAPAROTOMIES				
	N.L.	*Scl.*	*Acute*	*Neuro.*	*N.L.*	*Scl.*	*Acute*	*Neuro.*	*+ Neuro.*	*N.L.*	*Scl.*	*Acute*	*Neuro.*	
1927	8	6	3	48	–	–	44	12	5	3	1	–	13	143
1928	6	4	12	23	12	1	31	13	11	7	1	1	13	135
1929	21	4	2	17	8	–	48	5	7	16	2	2	7	139
1930	12	15	1	17	14	3	59	4	5	22	2	3	6	163
1931	7	5	3	12	15	1	67	5	7	28	3	5	4	162
	54	34	21	117	49	5	249	39	35	76	9	11	43	742
%	23.89	15.09	9.25	51.77	13	1.33	66.05	10.35	9.27	54.67	6.48	7.91	30.94	

In this Chart the first line gives the clinical diagnoses:— chronic appendicitis, acute appendicitis, or shows that the appendices were removed during a laparotomy performed for hystero-oöphorectomy, cholecystotomy, or cholecystectomy, etc. The second line gives the pathological diagnosis; no lesion (N.L.); sclerosis (Scl.); acute appendicitis (acute); and neuro-appendicopathy (neuro.).

The neuro-appendicopathy group includes the following: mucosal nerve hyperplasia containing numerous argentaffin cells (at least five in each section); mucosal neuromas with argentaffin cells; axial neuromas in obliterated appendices; musculo-nervous hyperplasia, with or without mucosal neuromas, and the combined argentaffin cells and sympathetic nervous tissue hyperplasia. In the section "acute appendicitis" a special column has been inserted to show the association of acute appendicitis and nervous lesions.

We would like to emphasize the following points in this Table.

The most striking point in the division "chronic appendicitis" is the high percentage of nervous lesions (51.77 per cent). We would not say that in this 51.77 per cent the nervous lesions (argentaffin or sympathic) were the only cause of the symptoms that have led to the

clinical diagnosis of chronic appendicitis. The high percentage, however, leads one to believe that, at least in many cases, the nervous alterations, the only visible lesions under the microscope, play an important rôle in the symptomatology. It is indeed our opinion that the most frequent histological lesion of the so-called "chronic appendicitis" is one in which the argentaffin cells of Masson and the nerve elements play the most important rôle. It is probable that the percentage 51.77 would be still higher if a greater number of blocks had been taken from each appendix. It sometimes happens where the neuromas are united by a few nerve fibres, that cross sections include only the tissue between two neuromas. Under such conditions the pathological diagnosis would be "sclerosis".

In the section "acute appendicitis" one notes that nervous alterations alone may give rise to characteristic symptoms of acute appendicitis (9.27 per cent), such as stabbing pain in the right iliac fossa, muscle guarding, vomiting, and even, as we have seen in two cases, fever.

The percentage of neuromas in obliterated appendices is 75.21. In the year 1927 it went as high as 87.8.

In the past the pathologist was often unable to demonstrate a lesion in the appendix that would correspond to the clinical diagnosis. Dr. A. Bertrand and I[7] have emphasized this point, and have made the suggestion that in the presence of clinical signs and symptoms pointing to acute appendicitis, where the leucocyte count is at or near normal, and disease of the kidney, ovary or bladder can be excluded, in a great many of such cases the diagnosis of neuro-appendicopathy can be made with assurance.

In the last section—appendices removed during the course of laparotomies—nervous lesions are also numerous (30.90 per cent). One may well ask if neuro-appendicopathy in women may not be the source of symptoms of the pelvic genital organs. At operation these organs often present no striking alterations. If in such cases the appendix is removed and studied histologically the surgeon should not be surprised to learn that the real cause of the clinical signs and symptoms is nervous alteration in the appendix.

One may say that the clinical diagnosis of appendicitis, even the acute form, is often incorrect. Uncertainty would at least be reduced by the closer collaboration of the surgeon, the neurologist, and the pathologist. If this is done the diagnosis "neuro-appendicopathy" would be made more often, and only such procedures carried out as are required in the presence of such a lesion.

I wish to express my best thanks to Dr. L. J. Rhea and to Dr. J. E. Pritchard who helped me in the preparation of my manuscript.

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MANUAL REMOVAL OF THE PLACENTA.—C. H. Peckham records an analysis of 186 cases of removal of the placenta with a view to emphasizing the danger incurred of puerperal sepsis. The incidence of such removal was one in 120 cases; it was more often necessary in white patients than in black patients, in multiparæ than in primiparæ, and in women during their later child-bearing years. The incidence was higher following prolonged labour, being particularly common in multiparæ delivered spontaneously after labour prolonged by uterine inertia, and more frequently necessary in premature deliveries. Hæmorrhage was the most common indication and retention of the placenta the rarest. The gross morbidity rate was 54.95 per cent, excluding patients who died within 48 hours of delivery. A febrile puerperium ensued in 48.48 per cent of the patients in whom spontaneous delivery was followed by manual extraction of the placenta. The gross maternal death rate was 10.76 per cent, and that due to sepsis was 3.23 per cent; in cases where delivery was spontaneous these two rates were respectively 10.45 and 4.48 per cent. Peckham concludes that the employment of this procedure should be strictly limited to cases when it is definitely indicated, and that intelligent care of the patient during the third stage of labour will lower its incidence by preventing partial separation. With the patient in good condition, and in the absence of bleeding, manual removal should not be attempted until two hours after delivery of the child, and when conservative methods of removing the placenta have failed.—*Bull. Johns Hopk. Hosp.*, April, 1935, p. 224. Abs. in *Brit. M. J.*

A REPORT OF THREE CASES OF CHORDOMA

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CHORDOMATA, or tumours arising from remnants of the notochord, were described as early as 1856 by Virchow, but their true nature was not suspected until Müller, in 1858, reported his researches, Not until Müller's work was confirmed by Ribbert in 1894 did these views meet with general acceptance, and the term "chordoma" come into use. During the present century a considerable number of cases of chordoma have been reported; these have been collected and reviewed from time to time, particularly since Stewart's paper in 1922.[16] Amongst other reviews are those of Coenen[4] (1925), Stewart and Morin[17] (1926), Cappell[3] (1928), Bailey and Bagdasar[2] (1929), and Montgomery and Wolman[10] (1933). The first mention of chordoma in the Canadian literature was by Stanton,[15] who reported two cases in 1932.

ETIOLOGY

In the human being, notochord tissue is found normally in the centre of the intervertebral discs, where, as the "nucleus pulposus", it is confined under tension and acts as a shock absorber for the vertebral column. It is not an uncommon occurrence for this notochord tissue to escape following injury to the thin cartilaginous discs, which, with the "annulus fibrosus", form the boundaries of the nucleus pulposus. This results in the formation of chordal extrusions into the vertebral bodies and these may give rise to pain. The x-ray picture of such an extrusion is usually that of an area of rarefaction in the body surrounded by a ring of increased density. The precise relationship between such aberrant notochord tissue and notochord tumours such as are reported in this paper is not known, but it is a generally accepted belief that chordomata arise from these notochord remnants. Chordomata arise also from other notochordal foci, at the extreme ends of the primitive notochord (spheno-occipital and sacro-coccygeal regions), and elsewhere (jaw, cranium, pharynx), but the exciting cause is not known. Over 125 cases of chordoma are now on record, and of these about 85 per cent have been situated at or near the extreme ends of the notochord remnants, *i.e.*, in the spheno-occipital and sacro-coccygeal regions. With the exception of a few isolated cases which have developed from heterotopic foci, the remainder have been found in the cervical, dorsal and lumbar vertebræ, chiefly in the cervical region, where 12 cases of chordoma have been described; 10 of these were reviewed by Owen, Hershey, and Gurdjian[11] in 1932. In some 7 cases the lumbar vertebræ have been involved, but the only paper we have been able to find reporting a case in the region of the dorsal vertebræ (similar to Case 1) is that of Hutton and Young,[8] whose case is also reported and discussed by Cappell.[3] The purpose of our report is to add to the rapidly growing volume of literature on chordoma, a case originating in the twelfth dorsal vertebra, and two arising from the sacrum.

CASE 1

P.C., a male, aged 36 years, a truck driver and pig-iron handler, was admitted to the Toronto Hospital for Consumptives on April 5, 1932, complaining of pain in the back, radiating around to the front of abdomen, and occasionally down the thighs.

The family and personal history were negative.

History of present illness.—The complaint of pain in the back was linked up rather indefinitely with an injury while at work six years before admission to hospital. On that occasion the pain was of short duration and kept the man away from work for a period of two days. The pain was directly over the site of injury in the spine and was relieved by rest and massage. During the subsequent five years the patient occasionally experienced similar pain, but did not regard it seriously until about one year before admission to hospital, when it became almost constant, began to radiate down his right leg, and was markedly increased by any exertion. In July, 1931, the pain became so severe that he stayed away from work for a week, but this rest gave him only temporary respite, and shortly after returning to work he had to stop again for three weeks, thereby losing his job. Pain became constant and was referred chiefly to the left flank. It then spread to the right side also and from December, 1931, on it became increasingly severe, so that he finally entered hospital in March, 1932. His case appeared to be one of Pott's disease, so that he was sent to the Toronto Hospital for Consumptives, after being placed on a Whitman frame.

The functional enquiry showed no abnormal cardio-vascular, respiratory, gastro-intestinal, or genito-urinary

symptoms, but the patient did complain that there had been an increase of vertebral pain and heaviness in the legs since he had been placed on the Whitman frame, two days before.

Examination on admission.—The patient was a well nourished, dark-skinned European male. Weight, 165 pounds. Blood pressure, 144/92. His temperature, pulse, and respirations were normal in the morning, but there was an evening elevation of temperature to between 99 and 100° F. Examination of the various systems revealed nothing of unusual interest. Urinalysis, sputum, and blood Wassermann test were negative. Blood examination showed hæmoglobin 96 per cent; red blood cells 4,700,000; white blood cells 11,400. While the spinal column showed no deformity, it was held rigid by muscle spasm, and any attempt at movement gave rise to severe pain in the lower dorsal region and radiating therefrom. There was no evidence of psoas abscess, psoas spasm, or paraplegia. The reflexes were normal.

X-ray examination of the chest showed only a few calcified nodes in the hila; films of the spine showed a peculiar mottled appearance throughout the body of the twelfth dorsal vertebra, which in addition was compressed from above downwards, so that its vertical diameter was only three quarters that of normal. The adjacent intervertebral discs above and below, were thinner than usual. The remainder of the vertebral column appeared to be quite normal, and no abscess shadow could be seen. The x-ray picture was not that of Pott's disease, in which destruction of the intervertebral disc and the adjacent surfaces of two bodies is the characteristic picture. (Figs. 1 and 2).

Subsequent progress.—It was decided to treat the case by recumbency, with an open mind as to diagnosis, until the exact nature of the vertebral lesion could be proved. Some form of malignant disease, such as metastatic new growth or myeloma was suspected. Three months after admission to hospital, the patient had to be removed from the Whitman frame, because his pain had increased instead of being relieved by this form of treatment. The pain radiated around the trunk from the spine and passed down both legs, and was frequently associated with femoral adductor spasm. An ascending motor, and, later, sensory, paralysis set in, so that paraplegia up to the level of the umbilicus was complete four months after admission. The bladder control remained normal, except for rare periods of urinary retention, until it became "automatic" six months later. There was a tendency towards fæcal incontinence from about the fourth to the eighth month, and then the bowels became very constipated. There was progressive anorexia and loss of weight; emaciation became extreme, and during the tenth and eleventh months of hospitalization gangrene developed over the bony prominences, and even over the calves of the legs. Throughout the progress of his illness, the patient's outstanding complaint was pain.

The urine was negative, and repeated examinations for Bence-Jones protein were negative. The spinal fluid showed no increase in pressure; it had a yellowish tinge; cell count normal; Wassermann test negative; colloidal gold negative; globulin strongly positive; subarachnoid block. A barium series of the gastro-intestinal tract, and a barium enema revealed nothing abnormal, and x-ray revealed no metastases in the long bones. Examination of thyroid and prostate glands revealed no primary new growths.

Repeated radiography of the spine during ten months showed a very slight but definite change in the affected region. The twelfth dorsal vertebra became more compressed and the adjacent discs thinner. The mottled appearance of the vertebral body grew more pronounced, due to increased rarefaction in some areas and increased density in others. There was no radiological evidence of extension of this pathological process to the adjacent vertebræ until ten months after the patient's initial examination. Films taken then, however, showed a mottling in the lower half of the eleventh dorsal and the upper half of the first lumbar vertebra, similar to that in the twelfth dorsal; the intervening discs had disappeared.

In January, 1933, a small swelling was noticed immediately to the left of the vertebral column, at the level of the twelfth dorsal vertebra. This appeared to be situated in the posterior chest wall beneath the muscle layer. It was smooth, rounded, and elastic to the touch, did not fluctuate, could not be moved freely, and was not tender or painful. It gradually increased in size to a diameter of about two inches, and to a height of about a quarter of an inch above the surrounding surface of the body. Later, smaller and more irregular swellings of a similar nature appeared on the opposite side of the spine, and could be traced by palpation half way out to the lateral margin of the thorax.

On March 3, 1933, a small incision was made over the largest tumour, for purposes of biopsy. As far as could be ascertained through so small an incision the tumour was the size of a lemon, lying beneath the muscles and in contact with the spinal column. The margins seemed to be well defined, and the mass consisted of grayish white, friable tissue which tore very easily when picked up by the forceps. There was very little bleeding, but there flowed from the incision a serosanguineous fluid which was in all probability mucinous. On March 4, 1933, the patient died, and post-mortem examination was refused.

Microscopic appearances.—Sections of the tissue (Fig. 5) removed at biopsy were made by Dr. J. E. Bates, of the Department of Pathology, Department of Health of Ontario, using the hæmatoxylin and eosin stain. "In these sections, the tissue consists entirely of a tumour growth. There is very little stroma present, and the tumour cells are found in irregular masses and in cords, with here and there a tendency towards an alveolar arrangement. Blood vessels, which are thin-walled, are found only in the sparsely scattered strands of fibrous tissue. Polymorphonuclear leucocytic infiltration is present throughout the growth. The cellular cytoplasm stains very poorly, and the appearance of the tumour cells varies greatly, from areas in which there is a somewhat alveolus-like grouping with very little or no vacuolation, to areas in which vacuolation has progressed to such a degree that the appearance is that of a loose syncytium with almost no cytoplasm present,—the typical, large, 'physaliphorous' or bladder-like cells of Virchow. The nuclei also show tremendous variation in size, shape, and staining qualities, and nuclear vacuolation is well marked, especially in those areas where cellular vacuolation is least evident. Mitotic figures are not to be found anywhere. The inter-cellular material is amorphous, granular and pale staining; only in one or two very small areas is it homogeneous and deep pink in colour. There are numerous areas of tissue necrosis. These microscopic findings are diagnostic of chordoma."

Comment.—This case is of especial interest because of the rarity of chordoma of the dorsal spine, only one other case in this region having been reported. The story of slow onset following an injury resembles that of other cases of vertebral chordoma. As far as could be determined this tumour was only locally malignant; very few cases giving rise to metastases have been reported. The tendency to confuse chordoma with Pott's disease, myeloma and metastatic new growth is illustrated by the story of this case. Had it been known that the pressure on the spinal cord was due to a localized tumour of low malignancy, no doubt a laminectomy

would have been attempted, if only for the sake of giving the patient temporary relief from his acute pain.

CASE 2

M.M., white, female, aged 49 years, clerk, was referred to Dr. W. E. Gallie (to whom we are indebted for the opportunity of reporting it) on April 16, 1929, with a history of aching in the back and pain in rectum.

Past illnesses.—None

History of present illness.—Two years ago she began to be constipated. (Subsequent examination abdominal only) revealed an abdominal mass. One year before a large ovarian cyst had been removed. Not long afterwards there was a recurrence of constipation, together with pain in the region of the sacrum and rectum and down the backs of the thighs. Purgatives and enemata had to be used from time to time, and in this way much impacted fæcal material was dislodged, and some comfort ensued. During the two months preceding her examination by Dr. Gallie there had been a considerable increase in the degree of pain and of constipation, so that she had consulted her doctor who found a tumour attached to the anterior surface of the sacrum.

Rectal examination revealed a rounded tumour, about the size of a small coconut, firmly attached to the left side of the sacrum, and having areas of stony hardness and other areas of elastic tenseness. No fluid was felt. The tumour could be palpated only by rectum. X-ray films showed destruction of a large portion of the anterior surface of the sacrum, its place being occupied by a partially calcified tumour projecting anteriorly into the pelvis. (Fig. 3).

Subsequent progress.—There was some doubt as to the nature of this tumour, and as the risks of operative removal were too great it was decided to use deep x-ray therapy, and a course of treatment was then given, with almost immediate improvement in the patient's general condition and local symptoms. Three months later the mass had subsided to the size of an orange, but was still stony hard and firmly attached to the sacrum. A

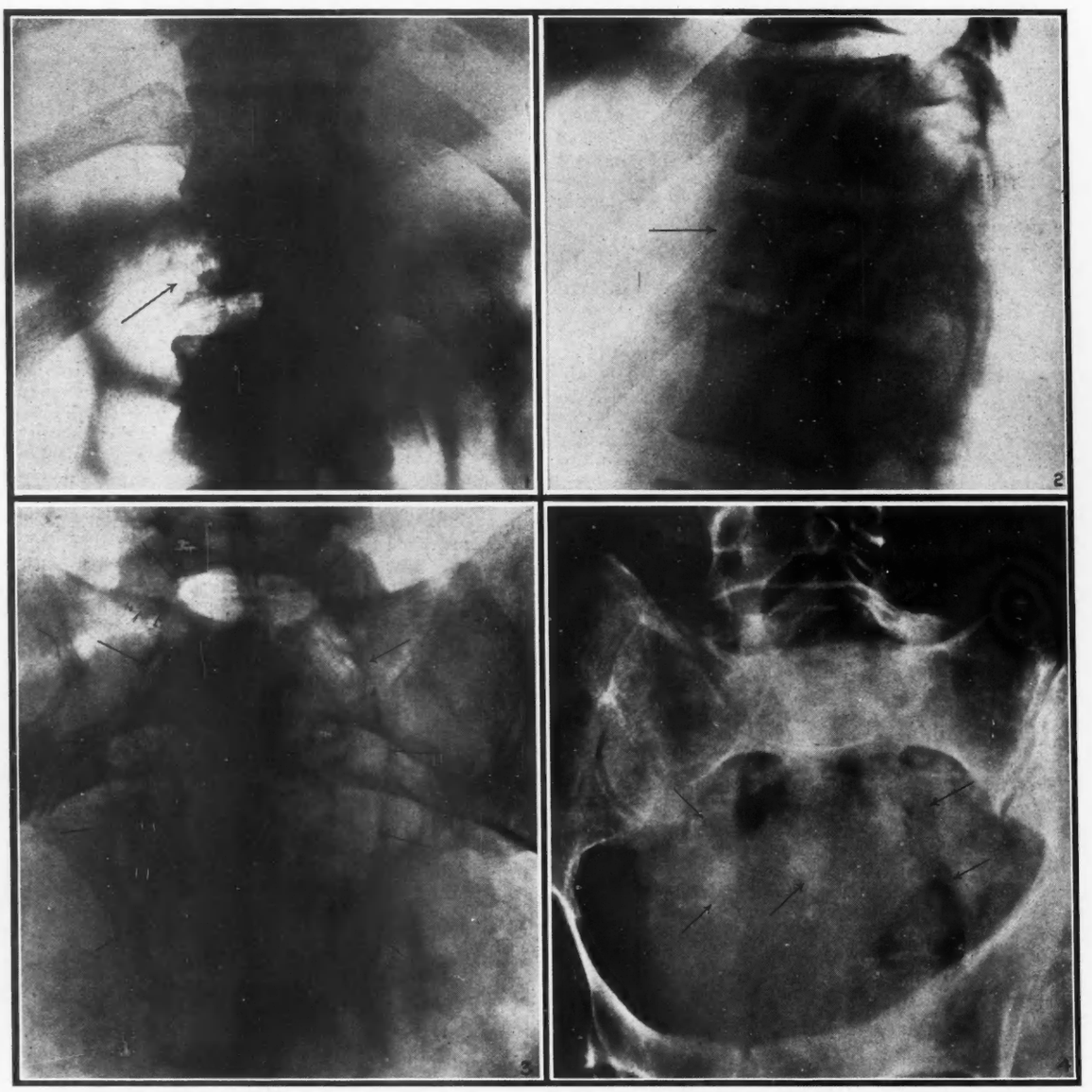

FIG. 1. (*Case 1*).—P.C., male, aged 36 years. Antero-posterior view of spine showing destruction of the body of the 12th dorsal vertebra by chordoma. FIG. 2. (*Case* 1).—Lateral x-ray of spine showing destruction of the body of the 12th dorsal vertebra by chordoma. FIG. 3. (*Case 2*).—X-ray of pelvis showing the destruction of the central portion of the sacrum by presacral chordoma. The arrows indicate the extent of the defect. FIG. 4. (*Case 3*).—X-ray of pelvis showing destruction of the lower half of the sacrum by presacral chordoma. The isolated masses of calcareous deposit are in the tumours. The arrows indicate the margin of the defect and some of the calcareous masses.

further course of x-ray treatment was then given. Five months after the second x-ray course, there was a return of rectal pain, and of constipation, and this time there was some difficulty in urinating. In the interim the patient had been engaged in her regular office work, and in October, 1930, another x-ray film had shown further calcification in the tumour. A third course of x-ray therapy was then given, and this was followed by severe nausea, vomiting and general malaise. In three months the patient lost 25 pounds in weight. The pain in the rectal region kept her awake at night, but x-ray films made in April, 1930, one year after her first examination, showed further reduction in the size of the tumour and further calcification.

The patient was not seen again till November, 1930, when her office work was being interfered with by incontinence of urine and fæces; in addition she suffered from sciatic pains down the left lower extremity and had lost weight. Rectal examination and x-ray films showed that the tumour had increased markedly in size, and the sacrum had become markedly eroded. She was referred to the Memorial Hospital, New York, where an aspiration biopsy was done in December, 1930, and intensive radium pack treatment given. Diagnosis remained uncertain, but metastatic bone lesion and chordoma were both suggested, while osteogenic sarcoma was excluded. Her condition grew steadily worse, and on November 14, 1931, she died.

Post-mortem report.—The only significant finding was a large globular mass in the pelvis, measuring 12 cm. in its greatest diameter, and covered by peritoneum except at its origin in the left wings of the first and second sacral vertebræ and the adjacent portion of the left iliac bone. It felt soft and boggy, and on attempted removal ruptured, spilling blood, clots, and fragments of tissue into the pelvis. The tumour tissue was very friable, being of the consistency of macerated placenta, with zones of necrosis. There were numerous fragments of bone throughout the tumour tissue, and the subjacent bone was soft, necrotic and spongy. Branches of the sacral plexus crossed the postero-lateral aspect of the tumour, and the sciatic nerve was exposed and passed through the tumour before entering the great sciatic notch. Nothing significant was found in the liver, spleen, kidneys, adrenals, pancreas, gastro-intestinal tract, and retro-peritoneal lymph glands.

Microscopic findings.—(Fig 6). The outstanding feature of all the microscopic sections examined was necrosis and hæmorrhage. Where the tumour cells could be seen, they were growing in somewhat fasciculated masses, separated by fibrous tissue trabeculations which were considerably more evident than in the previous case reported. The tumour cells themselves were large and polyhedral, and supported by a fine reticulum. The nuclei were fairly uniform in size and shape, being small, rounded and pycnotic; they did not show vacuolation or mitosis. The cytoplasm was present in large amounts, was pale staining, foamy, granular and vacuolated, but not to the degree noted in the previous case, and the typical "bladder-like" cells were less evident. No papillary structure was observed.

Comment.—This was a typical case of presacral chordoma, slowly increasing in size and involving adjacent structures. The absence of secondary growths is common. The encouraging response to deep x-ray treatment at first, and the ultimately malignant nature of the tumour were both characteristic features.

CASE 3

J.S., male, aged 53 years, was admitted to Toronto General Hospital on November 23, 1934, complaining of incontinence of urine and fæces, pain in the back, low down over the sacrum, radiating down both legs.

The family and personal history were negative save for his having had gonorrhœa 25 years before.

History of present illness.—About June, 1933, he noticed for the first time a sensation of numbness in both buttocks about the anal region. Sitting caused pain in this region. In October, 1933, difficulty in urination commenced, accompanied by swelling of the lower abdomen. For the treatment of this he was admitted to St. Michael's Hospital, where removal of the median lobe of the prostate was carried out. This gave him relief from his urinary obstruction, but a month later control of urination was lost. He had worn a rubber urinal since. At about the same time rectal incontinence also appeared, and had continued since. In February, 1934, pain in the back became a marked feature. An acute right epididymitis appeared and subsided under treatment. In October, 1934, pain in the back increased with marked radiation down the right leg.

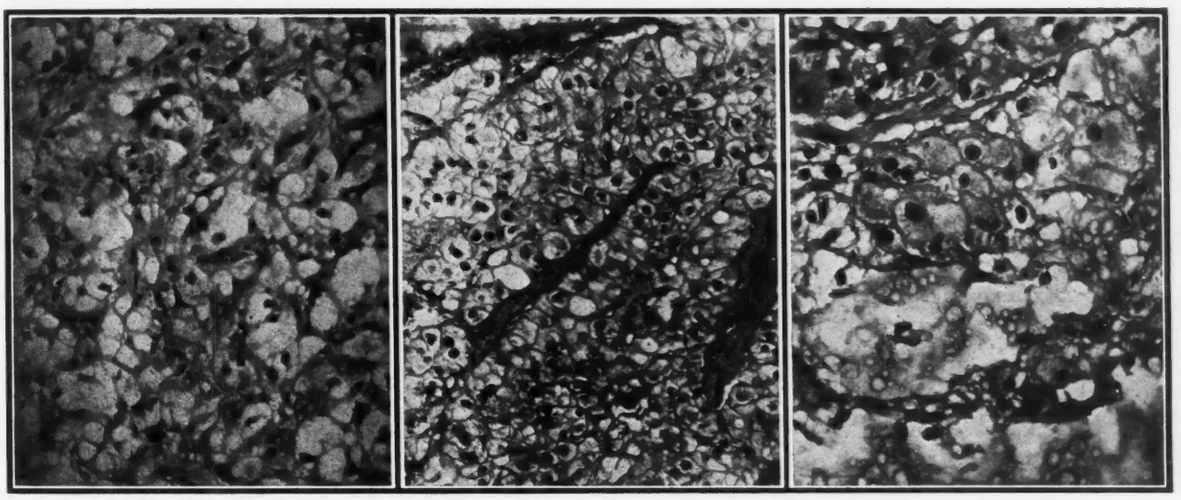

FIG. 5 FIG. 6 FIG. 7

FIG. 5. (*Case 1*).—Microscopic appearance of the tumour involving the body of the 12th dorsal vertebra. FIG. 6. (*Case 2*).—Microscopic appearance of the presacral tumour from material obtained at post-mortem. FIG. 7. (*Case 3*).—Microscopic appearance of the material removed from the presacral chordoma at biopsy.

Examination on admission.—The patient was an emaciated European male. The significant findings centred in the pelvis. He was completely incontinent of urine and fæces. There was a small firm nodule in the upper pole of the right testicle, representing the previous epididymitis. Rectal examination revealed a large smooth rounded mass, about the size of a grapefruit, springing from the anterior surface of the lower half of the sacrum. It was tense and elastic but did not fluctuate and was not tender. Under the left gluteus maximus muscle was a similar rounded tumour which seemed to be a direct extension of the primary tumour through the great sciatic notch. There was an oval patch of anæsthesia in the perineum, surrounding the anus. There was marked weakness of the muscles of the right leg and impaired sensation in this limb. X-ray showed destruction of the lower half of the sacrum. (Fig. 4).

A tentative diagnosis of chordoma was made, based upon the site of the tumour and its firm elastic consistency.

In order to establish a definite diagnosis a biopsy was performed on January 28, 1935. An incision was made over the left buttock. The fibres of the gluteus maximus were split. Beneath this muscle the tumour was exposed. It was pearly white, firm and almost completely avascular. A generous mass was removed for examination. Dr. W. L. Robinson reported upon the material removed, as follows: "The material removed by biopsy shows small groups of tumour cells interspersed with large areas of bluish mucinous material (Fig. 7). The cells vary in size, but the majority are very large, rounded and vacuolated, with a large deeply stained nucleus and much acidophilic cytoplasm. They are not arranged in any regular pattern. There is a moderate amount of fibrous tissue proliferation, much of which contains yellow and brown pigment. Blood vessels are infrequent."

Treatment consisted of radiation with x-ray. Sixteen exposures spread over a month did not influence the course of the disease in the slightest. If anything his condition was slightly worse in that paralysis of the leg was increased. He was discharged to his home in March, 1935.

Comment.—This again was a typical case of sacral chordoma, the most interesting feature being the early and extensive involvement of nervous structures due to the growth of the tumour backward and through the sacrum into the buttocks. The long history, even after the onset of urinary incontinence, was characteristic.

DIAGNOSIS

The diagnosis of chordoma is based on the microscopic findings, which closely resemble those described by Stewart,[16, 17] Cappell[3] and others, in their reports. Clinical diagnosis is extremely difficult, except occasionally in the sacro-coccygeal cases, but with increasing knowledge of the occurrence of this growth it will no doubt be recognized more frequently. Chordomata involving the vertebræ are very apt to be mistaken for foci of tuberculosis, but when the signs and symptoms do not respond to the usual immobilization treatment the true nature of the lesion should be suspected. While the roentgenological appearance of several other reported cases of vertebral chordoma has closely resembled that of Pott's disease, in our case the typical radiographic picture was lacking, the involved vertebral body showing small irregular areas of rarefaction surrounded by borders of increased density. These chordomata may also be mistaken for metastatic new growth, but as chordoma is only locally malignant, is of relatively slow growth, and frequently follows a definite injury, it should be possible to exclude this possibility by careful observation. Cases such as those reported by Willis[18, 19] forming metastases in lungs, liver, spleen, kidneys, heart, thyroid and skin are rare, and probably depend upon local invasion of blood vessels at the site of the initial lesion.

Sacro-coccygeal chordoma is likely to be mistaken for sarcoma in that region, but usually the rate of growth of the former is considerably slower. In all events, chordoma should be considered in making a differential diagnosis of any pelvic mass arising from the sacrum.

TREATMENT

In not a few instances surgical removal of the tumour has given temporary relief, but recurrence almost invariably follows. This type of treatment is best suited to early cases of sacro-coccygeal chordoma. Hutton and Young[8] operated on their case of thoracic chordoma in order to relieve the spinal compression and obtained very good results. Partial relief of paraplegia followed the laminectomy, the patient was able to get about in a wheel chair, and up to the time of their report, six months after the operation, he was cheerful and in fair health. Plenkert[12] operated on his two cases of presacral chordoma successfully, but they were early cases. Willis tried radiation therapy, without any effect on the growth. Generally speaking, there is no satisfactory treatment, but often temporary relief of symptoms may be obtained by the use of surgery or x-ray.

SUMMARY

One case of chordoma of the twelfth dorsal vertebra and two of presacral chordoma are reported. The necessity of excluding chordoma in all diagnoses of Pott's disease, of malignant metastases in the vertebræ, and of sacral sarcoma is stressed.

We are much indebted to Dr. W. E. Gallie for the privilege of reporting Case 2 from his private records, and to Dr. K. G. McKenzie for directing us to some of the literature on chordoma.

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PSYCHOGENIC FACTORS IN DERMATOSES

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THE literature concerning the rôle of functional nervous factors in relation to lesions of the skin is extensive, and only a brief summary of some recent studies will be given.

The autonomic nervous system is often important as an intermediary channel. The flexural hyperhidrosis of emotional stress is an abnormality of sweat gland innervation. Autonomic imbalance may result in vagotonia, a frequent accompaniment of neurodermatitis. The background of rosacea includes maladjustments and nervous tensions incident to the pressure and speed of modern life, thus altering the sympathetic activities of the gastro-intestinal tract and leading to increased histamine liberation and consequent peripheral vaso-dilatation.[1] Lichen simplex chronicus, and possibly prurigo nodularis, may be abnormalities of the itch mechanism dependent on altered sympathetic function.[2] Neurocirculatory instability, recently emphasized by Becker,[3] is closely related to the acute neurodermatitis of Kreibich.[4] It is said to be a prominent feature in many patients with urticaria.[5]

Nervous disorders may be minor components in a primarily allergic disease of the skin. Disseminate neurodermatitis (diathetic eczema)[6] apparently consists of an atopic and allergic hyper-irritability of the skin, occurring in overactive egocentric types. Periods of mental strain and emotional shock are commonly associated with the onsets of certain dermatoses, although the mechanism is unknown. Prominent in this group are lichen planus,[7] alopecia areata,[8] and the "seborrhœic eczematous ear".*

The last group to be mentioned is of equal interest to dermatologists and psychiatrists, and includes cutaneous lesions of various forms. Among these are paraesthesias, generalized pruritus, and excoriative or bizarre ulcerative changes due to deliberate[9] or unconscious actions[10, 11] on the part of the patient and associated with various forms of mental conflict. The case to be reported is an interesting example of this group.

The patient, a man of French extraction, married, aged 29, was first seen by one of us (F.E.C.) in October, 1934. The cutaneous eruption was a striking one, consisting of markedly excoriated papular and nodular lesions of a dull reddish colour, and limited to the extensor surfaces of both the upper and lower extremities. The chief feature of the eruption consisted of excoriations which were so severe that multiple superficial hæmorrhages and crusts and some secondary pustulation had developed. (Figs. 1 and 2).

Unfortunately, a photograph could not be obtained when the excoriated lesions were at their height. In

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* Stokes, J. H. and Cormia, F. E., in an unpublished review of thirty patients with seborrhœic eczematous changes limited to the ears, were impressed by the high proportion in which a history of emotional shock or mental strain was obtained.

Fig. 1 however, will be seen the distribution, character and striking linear arrangement of the eruption.

The eruption first appeared on the anterior surface of the right leg some six years ago in the scars of a healed osteomyelitis. In a short time similar lesions developed on the extensor surface of the left leg, both thighs and both upper extremities. The eruption varied in severity from time to time but was never entirely absent. During the past few years, however, the lesions and the associated pruritus gradually became worse and, according to a clinical report in 1932, multiple superficial oozing ulcerations surrounded by narrow zones of erythema were present. Extensive pigmentary remains of old lesions were present. A general investigation at that time revealed nothing of note, there being no history of drug ingestion, while the Wassermann test was negative. A tentative diagnosis had been made of tuberculosis of the skin, which, however, was not verified by a biopsy taken from the anterior surface of the right leg.

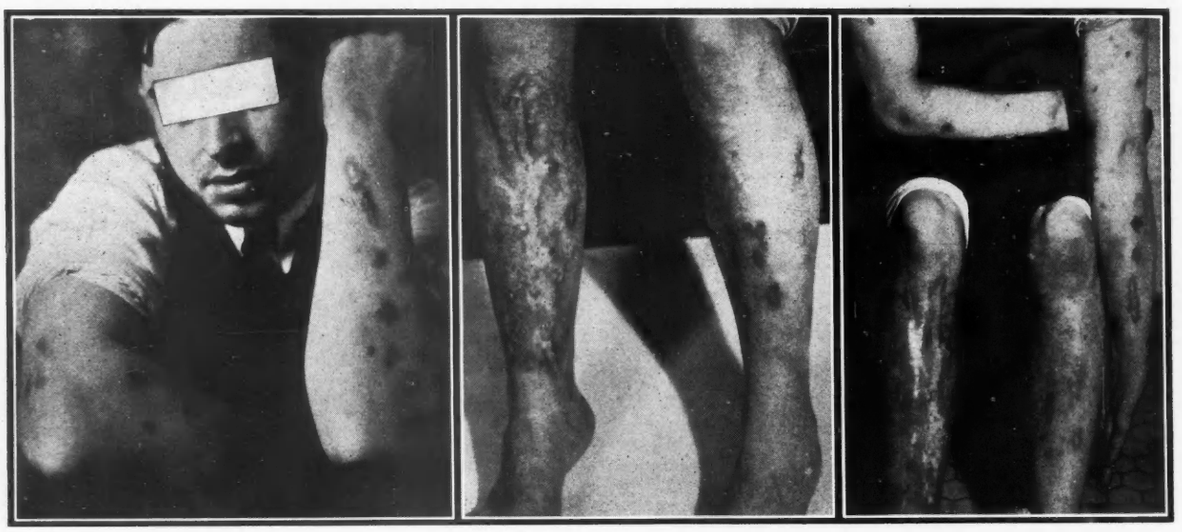

FIG. 1 FIG. 2 FIG. 3

Microscopic report. — There was a grade three acanthosis of the epidermis. Hyperkeratosis, rather than parakeratosis, was present. The stratum corneum was denuded in many areas. There was a quite marked intra- and inter-cellular œdema throughout the epidermis. The cells of the stratum spinosum and the stratum germinativum were not conspicuously abnormal. In certain areas the stratum corneum was separated from the stratum granulosum by small clusters of polymorphonuclear leucocytes. In these areas superficially placed papillæ were damaged, with consequent hæmorrhages from the dilated capillaries. The superficial areas of the corium showed a moderate perivascular infiltration with small lymphocytes and an occasional plasma cell; no giant nor epitheloid cells were seen.

Various forms of treatment were instituted at that time, but the lesions proved intractable to antiseptic and stimulating local applications. Exacerbations and remissions were noted. Approximately two skin units of unfiltered x-ray were given to each area without improvement. Repeated exposures to the air-cooled mercury lamp seem to have effected partial involution of the lesions. Treatment was unsatisfactory, however, as the patient was prone to lapse from observation for long periods of time.

The past history revealed evidence of marked pyogen susceptibility. He developed an osteomyelitis of the right tibia at the age of 13, and three operations were performed during the following two years. After three years of apparent cure, a small amount of purulent material escaped from the upper end of the old scar. This soon healed, however, and did not re-appear, nor has there been any recurrence. At the age of 20 he developed right pre-patellar bursitis following work which involved prolonged pressure on the knee. At 21 he had a severe olecranon bursitis of two months' duration following trauma. The terminal phalanx of the left thumb became severely infected at the age of 22, following an injury. The personal history was otherwise negative. The family history was irrelevant, except that one brother had been subject to repeated attacks of furunculosis.

Examination of the patient.—There was a markedly excoriated papular and nodular eruption limited to the extensor surfaces of both upper and lower extremities and over the lateral aspects of the buttocks. The lesions were medium to dark red in colour, rounded in transverse section, and varying from 2 to 6 millimetres in height. They were sharply demarcated from the surrounding healthy skin and linear in character, some being 2 to 3 inches in length. The surface of the lesions, unlike the verrucous hyperkeratosis seen in prurigo nodularis, was smooth. The fine reticulated and purplish appearance characteristic of hypertrophic lichen planus was not present. Patchy areas of pigmentation and multiple scarring, the result of healed lesions, were seen throughout the involved areas; a few of the scars were slightly keloidal. On the right leg the appearance was complicated by the presence of the scarring from the previous osteomyelitis. The lesions were clearly the result of the excoriations which were such a prominent feature in the case. In keeping with the fact that the patient was right-handed the lesions were much more severe and extensive on the left arm and right leg. It is noteworthy that all the lesions were in concealed areas. The mucosæ were clear. Apart from hyperactivity of the reflexes the general physical examination was completely negative.

Psychiatric examination.—The patient gave a history of having suffered from the lesions from about one year after marriage. Difficulties in the marital relationships were already in evidence, the wife being sexually frigid. She belonged to that class of women who apparently do not achieve vaginal orgasm but can on occasion have a so-called clitoral orgasm, the latter being most likely to occur if the husband adopted the supine position, which arrangement she would occasionally seek. It is worthy of note, as indicating the masochistic trends in the patient, that this form of coitus was particularly acceptable and desired by him. There were no extra-marital relations, and the patient has restrained his sexual urges throughout most of his married life.

The sequence of events relating to the cutaneous phenomena is as follows. In the process of restraining sexual desire the patient experiences an intense pruritus which invariably commences in the scarred area of the right leg. He begins to excoriate this region but, shortly, experiences pruritus in the other leg and both arms, and proceeds to excoriate these areas also. This process usually continues for thirty to forty-five minutes, and then a form of climax is reached. However, this might occur in a shorter time, if blood appears. The climax is featured by an intense, burning sensation in the skin which is followed by a sudden feeling of marked relief, and he then goes to sleep. He spontaneously described the relief as identical with that which follows sexual intercourse. It is noteworthy that the pruritus only occurs at night time and when in close relationship to his wife, and does not occur, for example, if he occupies another bed. On the rare occasions when he has masturbated the pruritus ceased, and it is striking that with the resulting genital orgasm he would experience a slight burning sensation in the skin lesions. Furthermore, there has been a marked increase in the severity of the skin lesions during the past two years. In this period the sexual conflict has been greater due to his being out of work and hence much at home. The recent practice of coitus interruptus has been an additional aggravating factor. That he has a marked dermal irritability is indicated by the bouts of pruritus which have followed on accidental knocks. The increased sensory reactivity was also manifest on rectal examination, following which he felt "queer all over" and experienced sensations in the head of an upsetting nature.

Treatment.—During the course of this enquiry the patient came to recognize the actual nature of the lesions and the course of events that had led to their formation. He was given antipruritic lotions and a sedative mixture of luminal and bromide, and encouraged to make further efforts to secure work. An undoubted improvement followed these efforts. There is no doubt that a marital adjustment would have led to a more satisfactory outcome, but the cooperation of the wife could not be obtained.

Because the patient was unable to refrain from excoriating himself an experiment was done by covering the legs with adhesive plaster over surgical gauze. At the end of six days it was found that the lesions were practically healed, although fresh excoriations had been made on the left arm. Therefore both arms and legs were covered in the same fashion and, after removal at the end of the week, the lesions on the arm had also practically disappeared. Fig. 3 shows the presence of residual pigmentation and slight keloidal change in the scars.

COMMENT

This case is clearly of equal interest to dermatologist and psychiatrist, and is an example of the intimate relationship of the two subjects. The patient presented organic lesions of the skin, the ultimate casual factors of which were clearly proved to be psychological. It should be noted that the patient originally had no insight as to the mechanism of production of the eruption. Further, there was no appeal for sympathy, compensation, or other conscious gain, which, rightly or wrongly, is so frequently attributed to cases of dermatitis factitia.

From the diagnostic standpoint, the distribution, the form, and the obvious linear character of the lesions, which were of an indeterminate nature, prompted a more complete psychiatric investigation. Only after detailed study was the actual nature of the condition revealed. The case illustrates the necessity of considering the possibility of psychological factors in the causation of ill defined itching dermatoses.

The patient presented a personality which clearly showed characteristics of a passive and masochistic variety. The "climax" reached through excoriation was equated by the patient very definitely with the effects of genital orgasm, although there was no genital excitement or discharge. The "discharge" effect was described solely in sensory terms—that is, of burning in the skin, which presumably was associated with a vaso-motor change. In any case, the "discharge" phenomena relieved sexual tension in an identical fashion with that resulting from genital orgasm. Thus the case is interesting as an example of the transference of discharge of sexual tension to an extragenital mechanism.

SUMMARY

1. An ill-defined eruption of long standing proved to be the result of emotional conflict.

2. The diagnosis was confirmed by the rapid involution of the lesions when the limbs were protected from excoriation.

3. The patient was of a masochistic type and obtained relief of sexual tension through excoriation, thus producing lesions which resisted all forms of local treatment, and on which various diagnoses had been made, including that of "tuberculosis of the skin".

4. The case illustrates the fact that sexual tension may be relieved through an extragenital mechanism.

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Case Reports

A CASE OF AGRANULOCYTIC ANGINA (MALIGNANT NEUTROPENIA)*

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On September 25, 1933, Mrs. A.V., aged 24 years, came to my office complaining of weakness, loss of appetite and loss of weight.

She had been born in Canada of French-Canadian parentage. The personal and family history were uneventful.

History of present illness.—The patient gave a history of "weakness" in 1929, which lasted for four months. This apparently was not characterized by any special symptom. She married in 1930, and within the next two years bore two healthy children. Both pregnancies were marked by an excessive amount of nausea and vomiting, and she was so weak that she spent the last month of her first confinement in bed. However, the children developed normally. After the second child, which was born in September, 1932, the patient continued to feel weak, in spite of tonics and rest. She gradually lost her appetite, and in the last two weeks before I saw her she had complete anorexia, which may have accounted for a loss of about twenty pounds in weight. Eating would cause pain in the right lower quadrant. She became a restless sleeper, and the weakness was complained of continually. There was no cough or symptom of respiratory disease. There was nocturia (once nightly) but this had been present for about three years.

Examination revealed an apathetic, stooped, under-nourished, but well-developed woman of about the stated age. The skin was of a healthy colour. There was evident loss of subcutaneous fat; the muscles were flabby and soft. A few moist râles, none post-tussic, were present in both upper lobes. The heart was of small size, with no murmurs. The pulse was 82 per minute, of low tension and moderate volume. The abdomen was scaphoid, slightly tender throughout, and moderately more so in the right upper and right lower quadrants. No palpable masses were present. The uterus was enlarged to the size of a two months' pregnancy. Radiographic examinations of the colon and chest were made; beyond the suggestion of a chronic appendicitis of retrocæcal location, they gave no information. The blood was not examined.

My impression was of an individual of the asthenic or leptosome type of physique; pregnant for the third time in three years, with mild infection in the bronchi, in the vermiform appendix, and possibly in the gall-bladder. She was sent to her home in the State of Maine with instructions to rest for one month and to take the tonic prescribed and to return in one month for re-examination. Her husband was warned of what symptoms to expect if acute appendicitis developed.

On October 22nd, four weeks after the consultation, she had a watery vaginal discharge. This became bloody and continued until the 27th. On October 30th she had several chills. At 10 a.m. on October 31st she suddenly felt very weak, vomited frequently, and developed severe headache and pain in the lower abdomen. I saw her early on November 1st and had her admitted to the Montreal General Hospital, at 7.30 a.m. At that time she was evidently seriously ill. An acetone odour of the breath was marked, the cheeks were sunken, the eyes

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unnaturally bright. The abdomen was soft, with tenderness in the right lumbo-costal angle and in the epigastrium. The temperature was 103° F.; the pulse 145 per minute.

On admission the entire pharynx was found to be deeply congested and "beefy red". The left tonsil was markedly swollen, with a number of patches of exudate of the follicular type. The left cervical lymph-nodes were enlarged and very tender. There was relative dullness and lagging on expiration in the right apex, no râles. The first and second heart sounds were equally well heard at the apex; no arrhythmia; no murmurs; no signs of cardiac decompensation. The liver and spleen were not palpable. The hæmoglobin was 70 per cent; the red blood cells 4,300,000 per c.mm.; white blood cells 700 per c.mm. The differential count was: polymorphonuclears, none; lymphocytes, 15; monocytes, 9; eosinophiles, none. The blood count was checked four times. The benzidine test of the stool was two plus. An impression of agranulocytic angina was recorded. Treatment consisted of intramuscular injections of pentose nucleotide, 10 c.c. b.i.d., an ice collar, a warm gargle and antipyretics.

November 2nd.—A leucocytic response was evident this morning, but no granulocytes were present in the peripheral blood. The entire left tonsil was covered with a grayish membrane becoming gangrenous at one point. The lymph-nodes on the right side of the neck were tender, but the right tonsil was not affected. Late in the evening vomiting of a yellowish-brown fluid took place. The throat was markedly reddened. On both tonsils and on the left lateral pharyngeal wall were patches of a grayish-white necrotic tissue. The neck was moderately swollen and tender. The cervical lymph-nodes were enlarged and tender. The tongue was moist, somewhat coated, and protruded from the mouth in the midline. The left membrana tympani was slightly reddened. The patient spoke in a dry "cracked" voice. The temperature was 106° F.; the pulse 152 per minute, of moderate volume and regular in rhythm. The blood pressure was 116/75. There was neither cardiac enlargement nor œdema. The patient was mentally clear and composed. The superficial abdominal veins were somewhat distended. Indefinite tenderness was present in the hypogastrium, but no increased resistance. The flanks were not tender. There was a small amount of vaginal bleeding. The throat culture showed *Strept. hæmolyticus, Staph. citreus* and an unidentified diplococcus. The blood culture showed *Strept. hæmolyticus.* The patient was given 1,000 c.c. of 10 per cent glucose-saline intravenously, intramuscular injections of pentose nucleotide, 10 c.c. q. 4 h., and morphine sulphate, grs. one-sixth, with good effect. Despite these measures she spent a restless night. Death occurred at 7.30 a.m. the next day. A few minutes before death a fetus, five cm. in length, was expelled. It had been dead several days.

In summary, my impression of this case is that of chronic benign neutropenia of four years' duration, influenced adversely by pregnancy, finally culminating in abortion and agranulocytic angina (malignant neutropenia) with the usual rapid course. There was an accompanying streptococcic septicæmia.

I wish to thank Drs. Campbell Howard and Fraser Gurd, of the Montreal General Hospital, for their help in this case, and for permission to quote from the hospital records.

CARCINOMA OF THE RIGHT KIDNEY WITH METASTASES

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The following case of carcinoma of the right kidney with metastases is of interest in view of the fact that no signs or symptoms pointed to a kidney lesion and that the case was admitted to the hospital owing to chest findings, and, indeed, classed as myocardial decompensation.

The patient, a male, aged 41, was admitted to the Victoria Public Hospital, Fredericton, N.B., on February 13, 1935, complaining of shortness of breath on exertion, progressive weakness, loss of weight (40 lbs. in 6 months), swelling of the feet, a dull ache in the abdomen, sleeplessness, dryness of the mouth, and hoarseness.

Personal and family history showed nothing of importance.

The present illness.—The patient stated that he first developed shortness of breath about six months prior to admission. He kept getting

weaker, more short of breath, and losing weight, until finally he was forced to take to his bed, which was about five weeks before we saw him. About this time he noticed that his feet were quite swollen, and a dull ache had developed in his abdomen. His appetite was poor; the bowels were regular. He perspired freely. There were attacks of heartburn.

Physical examination.—The general appearance was that of cachexia. There was a mass, the size of an egg, above the left clavicle which felt like a bunch of grapes, firm in character, and fixed to the underlying tissue but not to the skin. The heart was not enlarged; the sounds were well heard and were regular, without murmurs.

The right chest gave a flat note to percussion, and the left lung was negative except for a few crepitant râles at its base. There were no palpable lymph nodes in the axilla or groin.

The abdomen was full, thin-walled, with distended veins. There was tenderness on deep palpation all over. The percussion note was tympanitic, with dullness in both flanks. The liver and spleen were not palpable; no mass felt. A left sided inguinal hernia was present and reducible. Both testicles were in the scrotum and not enlarged. The reflexes were all normal. The rectal examination was negative. Blood pressure 115/75.

Laboratory findings. — Repeated urinalyses were negative. No leucocytosis; hæmoglobin 60 per cent. The differential count showed 90 per cent of polymorphonuclears. The right-sided chest fluid showed a moderate amount of lymphocytes, and a few large cells with mitotic figures. No occult blood was found in the stool. The blood Wassermann test was negative.

A radiographic examination of the chest showed a mass about the size of an orange at the base of the heart; a right sided hydrothorax; and pea-sized spotted areas in both lungs, more so in the left.

During his fourteen days in the hospital the patient ran a normal temperature, with an average pulse rate of 90 and respirations, 22. He perspired a good deal and was very restless. The left supraclavicular mass gradually increased in size, and on February 16th a biopsy was done on this mass. The pathologist reported it to be malignant. The cells were transitional in type and arranged in a papilliferous manner. Pain in the abdomen first began to be severe on the 12th day, and about this time he had involuntary defæcation, dyspnœa, and twitching of the face. The patient expired on February 27, 1935.

Post-mortem examination.—The abdomen contained bloody fluid. The omentum was greatly thickened and firm. The retroperitoneal glands were enlarged. The intestines, liver, spleen and left kidney were normal. The right kidney was enlarged and nodular. Cut section showed many white, firm, nodular areas. There was one mass, the size of a lemon, in the right suprarenal area, adherent to the right kidney. Both pleural cavities contained straw-coloured fluid. The heart was normal in size, with no valvular defects. A firm nodular mass was present at the base of the heart. Both lungs on section showed several metastatic areas.

The report on the sections prepared by R. A. H. MacKeen, Provincial Pathologist, gave a diagnosis of primary papillary carcinoma of the right kidney, with metastases in the lungs, omentum, retroperitoneal, mediastinal, and supraclavicular glands.

A CASE OF IDIOPATHIC DILATATION OF THE ŒSOPHAGUS

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The disease ordinarily known as cardiospasm although relatively rare, is sufficiently common to be familiar to everybody and there is a considerable volume of literature in reference to it. In regard to its surgical management a number of procedures have been tried, but most of them have been found unsatisfactory. The report of the case given here lends support to the opinion of Dr. F. A. C. Scrimger, of Montreal, that simple œsophagoplasty is an efficient and safe procedure for the cure of the condition. For a more detailed discussion of the condition reference is made to Dr. Scrimger's paper (*Annals of Surgery*, Nov., 1931). It might be well, however, to point out that "idiopathic dilatation" is a better descriptive term than "cardiospasm". In these cases there is no evidence that spasm really exists, but rather the opposite condition, namely, flaccidity and dilatation of the œsophageal wall. This loses its power of contraction and becomes dilated and elongated. As a result of this elongation it

naturally kinks at the fixed points. The lower fixed point of the œsophagus is at the cardiac orifice where it passes through the diaphragm. This, lying a little to the left, where normally the œsophagus has to make a slight curve, allows a dilated and elongated œsophagus to lie to the right on the dome of the diaphragm; thus an acute kink with obstruction to swallowed material is formed. The greater the elongation and the greater the weight of swallowed material in the œsophagus, the greater becomes the obstruction. Accepting this as the cause of the dysphagia and obstruction, the relief is naturally to straighten out the tube and leave no redundant œsophagus above the diaphragm.

CASE

L.K., aged 34, male, was referred by Dr. J. P. McGrath on December 10, 1934. His complaints were difficulty in swallowing and a choking sensation with substernal distress upon eating.

History.—The patient stated that he had been perfectly well until about one and one-half years before, at which time he noted slight difficulty in swallowing and had to take a longer time in eating his meals. This condition was at first mild, but progressed so that with each meal he had marked substernal distress and a choking sensation. There was no history of having swallowed any corrosive substance. He found it as difficult to swallow water as he did solid foods. At the time of examination he had a choking sensation with every meal and had to eat slowly and in small amounts. Large amounts would be returned. He had lost weight. X-ray examination at this time showed the following.

Studies of the œsophagus following the examination with an opaque mixture of barium and acacia presented the following findings. With fluoroscopic examination there was a definite delay in the passage of the barium into the cardiac portion of the stomach. The œsophagus was moderately dilated; that is, above the constriction it appeared to be about an inch and a half to two inches in width. This dilated portion of the œsophagus ended abruptly at a point which appeared about an inch above the diaphragm. It came to a distinct point and from here slowly passed into the stomach through a rather tortuous constricted area. The barium really trickled into the stomach from what appeared to be a head of pressure created by the column of barium. No peristaltic action was noted in the œsophagus.

Summary.—Would advise recheck after one month of medical treatment. The condition does not fit in exactly with an idiopathic dilatation or so-called "cardiospasm" of the œsophagus, as the constriction appears to be about an inch above the diaphragm, and the œsophagus is not extremely dilated or kinked.
November 5, 1934.

The man was put on medical treatment for a month without improvement and again x-rayed with the following report.

Further studies of the lower end of the œsophagus revealed practically the same findings as previously reported, namely, there is a definite delay at the cardia with dilatation of the œsophagus above. At this examination the œsophagus is somewhat more dilated than previously, it being about two inches or two inches and a half in width. The picture is not typically that of idiopathic dilatation, nor does it fit in with typical malignancy. Advise examination with the œsophagoscope.
December 5, 1934.

He returned home, continuing his régime of small, frequent, soft feedings, but again presented himself on February 5, 1935. Swallowing had become progressively more difficult, and for three days previous he had been unable to swallow anything at all. Any attempt would result in regurgitation. Beside this, there had been an almost constant bringing up and expectoration of a white, frothy fluid.

On February 6, 1935, an œsophagoscopy was done by Dr. J. P. McGrath, avertin anæsthesia being used. The œsophagoscope passed with no great difficulty. Considerable frothy mucus was found throughout the œsophagus, which had to be sucked away. Under direct examination the œsophagus was found dilated to the diaphragmatic level, but not greatly so. The mucous membrane was rather pale. There were no ulcerations. A definite block was encountered 44 cm. from the teeth, through which the instrument could not be passed, nor could the small metal sucker. No ulceration seen at this point. (Note: As afterward shown, this obstruction was due to a kink in the œsophagus, and the instrument came down directly upon the dome of the diaphragm to the right of the cardiac opening. Had a soft, rubber tube been used instead of a straight metal one, it would have passed into the stomach).

Operation (Scrimger œsophagoplasty) was performed on February 14, 1935, under ether.

A Marwedel incision was made from about 3 inches above the xiphoid and carried down to a level of the umbilicus. The muscles were separated and elevated from the costal cartilages and the 7th cartilage divided close to the sternum. The 7th, 8th and 9th were then divided at the costochrondral junctions. This formed a flap of the costal margin and diaphragm. The posterior sheath was then opened and the abdomen entered. By reflecting the costal flap upward and to the left the upper surface of the left lobe of the liver was well exposed. The left triangular and coronary ligaments of the liver were cut through and the liver reflected downward and to the right. This gave excellent exposure to the sub-diaphragmatic space and abdominal portion of the œsophagus. The sub-dia-

phragmatic portion of the œsophagus was short and about ¾ inch in width. There was no hypertrophy or thickening of the muscle. A large vein running over the anterior surface of the œsophagus was caught, tied, and divided. The crura of the diaphragm were cut in a radial manner and the mediastinum entered. The œsophagus was found lying well to the right on the dome of the diaphragm. Immediately above the diaphragm it was kinked and dilated. It was mobilized by blunt dissection with the finger, but could not be well pulled through the diaphragm. The left vagus nerve, and then the right, was sectioned to allow it to come through. Having cut both these nerves about 3 inches of dilated œsophagus could easily be delivered into the abdomen. No thickening of the œsophageal wall or mediastinal lymph glands could be made out. The distended portion of the œsophagus was then sutured to the diaphragm, thus bringing a portion of dilated part below the diaphragm and straightening the tube. The coronary and triangular ligaments were then sutured to the diaphragm at the line of section and the wound closed in layers.

The post-operative course was entirely uneventful. The following day the patient was put on small frequent feedings which he took without difficulty or distress. His diet was increased until at the time of discharge he was on a fairly liberal house tray, with instructions to eat slowly. On March 5, 1935, the x-ray examination showed the following.

Fluoroscopic examination of the œsophagus was carried out in the right oblique position, using a mixture of barium sulphate and acacia as a contrast medium. The patient was instructed to swallow one mouthful at a time and the following observations were noted.

The barium was seen to flow down in a normal manner until the head of the column reached the opening through the diaphragm. At this point there was slight delay (not more than 5 or 6 seconds) and the contrast medium was seen to follow a narrow course for a distance of 7 centimetres and spill into the stomach. This length of œsophagus below the diaphragm was slightly tortuous. After the bulk of the barium passed into the stomach a small residue was left in the lumen of the œsophagus just above the diaphragmatic opening. This passed through after the patient performed the act of swallowing or when he drank another mouthful of the mixture. There was no peristaltic action, and barium dropped into the stomach, apparently by gravity. Dilatation of œsophagus not more than one and one-half inches and it has greatly reduced in size. The œsophagus is now straight to the diaphragmatic level.

The patient is now on a liberal diet and has had no recurrence of symptoms.

Clinical and Laboratory Notes

AN IMPROVED SOURCE OF ULTRA-VIOLET LIGHT FOR THE DIAGNOSIS OF RINGWORM OF THE SCALP

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The diagnosis of ringworm of the scalp was greatly facilitated in 1925 when Margarot and Devèze[1] discovered that hairs infected with fungi of the genus *Microsporon* fluoresce characteristically when examined in the dark with filtered ultra-violet light. If, in a darkened room, such a light is directed upon the scalp, hairs infected with *Microsporon audouini*, *Microsporon lanosum*, and *Achorion schoenleinii* emit a characteristic brilliant green light which contrasts vividly with the dark colour of normal uninfected hairs. As shown in a previous communication[2] this fluorescence is not produced in hairs infected with fungi of the *Trichophyton* species, but as the vast majority of cases of tinea capitis are caused by the genus *Microsporon* the fluorescence test is extremely useful from a diagnostic standpoint. Figs. 1 and 2 show the distribution of the fungus in the hair and follicle by direct light and the fluorescence by ultra-violet light.

Undoubtedly the best source of the so-called "Wood's light" used for this purpose is a water-cooled quartz mercury-arc lamp, fitted with a Wood's glass or some other filter which transmits the longer ultra-violet waves and absorbs most of the visible light. The expense and difficulty of transportation of such a lamp makes it impractical for general use. In 1932 Davidson and Gregory[3] produced an inexpensive portable lamp which could be plugged into any lighting circuit. For practical purposes this lamp served equally as well as a quartz lamp, but it was realized that a more suitable design could be made and, as a result, an improved portable lamp (Fig. 3) which is inexpensive, smaller, lighter, and more effective has been produced.

Referring to the diagram (Fig. 4), the lamp consists of (1) an aluminum body for lightness; (2) a specially designed oxidized aluminum reflecting surface; (3) a special miniature type incandescent bulb with a cured filament; (4) a screwed filter holder; (5) a filter of two thicknesses of 5 m.m. Corning H. R. Red Purple Ultra Glass No. 587; and (6) a socket for the light source. The other parts are incidental to the lamp and are a small transformer (7)

for reducing the ordinary domestic 110 volt A.C. lighting current to the proper voltage for operating the lamp; or if an electric source is not available the lamp can be operated by means of the batteries (8), together with the rheostat (9) for regulating the voltage, and a small voltmeter (10) to indicate the proper voltage.

The lamp is small, being only 2 inches in diameter and 3 inches long, with an overall length of 5 inches, including an insulated handle. Its weight, including the switch and cord, is only 10 ounces. The small transformer, which is not handled during the examination, measures 2 by 7 by 2½ inches, and the entire

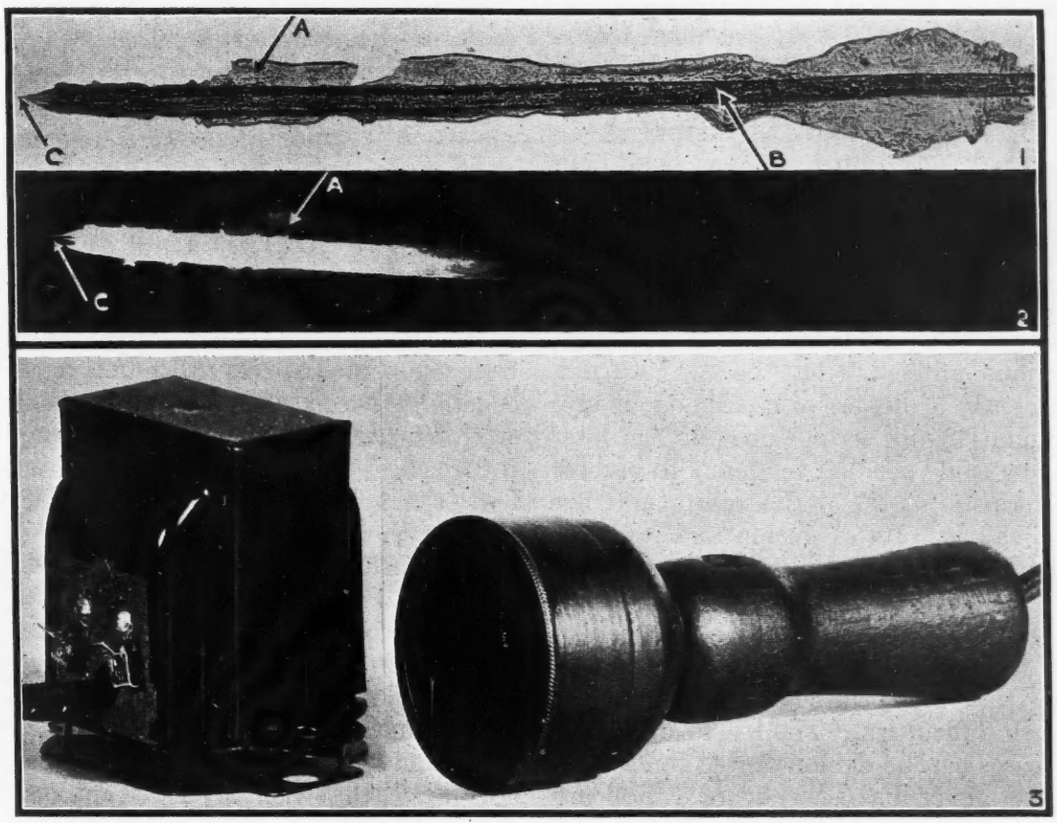

FIG. 1.—Hair and follicle without hair-bulb in early stage of infection by *Microsporon felineum*, photographed by visible light. *A*, the spore sheath surrounding the part of the hair penetrated by the fungus; *B*, the uninvaded portion of the hair shaft, outside which, however, the fungal hyphæ could be seen on staining. *C*, the broken end of the hair. FIG. 2.—The same specimen photographed by ultra-violet light. *A*, faint fluorescence of the spore sheath; *C*, the broken end of the hair showing fluorescent hair fibres. The intensity of the fluorescence of the infected part of the hair fades rapidly towards the uninfected portion. FIG. 3.—Portable lamp and transformer.

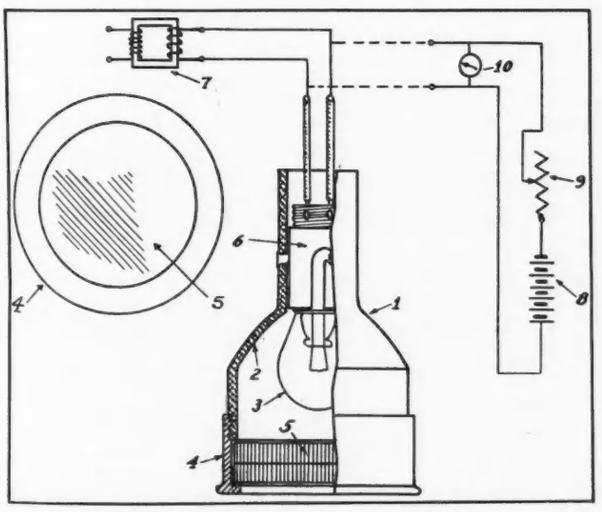

FIG. 4

apparatus can be carried in a small case, 5 by 7 by 2 inches, or packed in the doctor's everyday bag.

The lamp does not overheat, because it consumes only about 18 watts of power as compared with the consumption of 200 to 500 watts by other types of lamps previously used for this purpose. It is designed with sufficient radiating surface, painted a dull black to dissipate the heat generated. The bulbs cost only a nominal sum and have a life of about 10 hours, making the operation of the lamp very economical. In rural districts where no electric service is available, the lamp can be operated from inexpensive flash light batteries or dry cells.

The fluorescence test, as described in "Kitten Carriers of *Microsporon Felineum* and their Detection by the Fluorescence Test"[4] and "The Treatment of Ringworm of the Scalp by Thal-

lium Acetate and the Detection of Carriers by the Fluorescence test",[5] is invaluable on account of the rapidity with which contacts can be examined and the progress of patients under treatment noted, and it is our opinion that this lamp, because of its low cost, portability and efficiency, is a useful diagnostic instrument.

For the privilege of reproducing the illustrations we are indebted to the National Research Council of Canada, Ottawa.

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Editorial

VIRUSES AND RHEUMATIC FEVER

RHEUMATIC fever is one of the most serious ailments that befall mankind. Preeminently a disease of childhood, it lays the foundations for serious disability in later life, owing to its peculiar tendency to involve the myocardium, the pericardium, and the cardiac valves. Its evolution and its gross and histological morbid phenomena strongly suggest a microbic origin. Yet, despite intensive study, extending over a period of nearly fifty years, while much has been learned, that study has served only to lay bare fresh difficulties. The recent discovery that viruses can be demonstrated in cases of rheumatic fever has served to complicate the problem still further.

The microbic theory as to the nature of rheumatic fever dates from 1887, when Mantle[1] described a diplococcus which he had isolated from the blood of patients with acute rheumatism. The widespread belief that a streptococcus is an etiological factor in this disease is based mainly on the work of Triboulet and Apert[2] in France, of Westphal, Wassermann and Malkoff in Germany,[3] and of Poynton and Payne[4] in England. Then came the division of the streptococci into various types, such as viridans, hæmolyticus, non-hæmolyticus, and indifferent. At the present time the tendency is to attribute the principal rôle to hæmolytic streptococci. A strong argument in favour of the streptococcus as an etiological factor in rheumatic fever is the fact that after infection with the hæmolytic type the blood of the host develops streptococcal antihæmolysins (antistreptolysins) in high titre (Todd,[5] Coburn and Pauli,[6] Myers and Keefer[7]). The last-mentioned workers found this to be the case not only in rheumatic fever but also in rheumatoid arthritis, and, as one might expect, in acute follicular tonsillitis, scarlet fever and erysipelas. Of course, this does not prove that hæmolytic streptococci are the sole, or even the essential, cause of rheumatism. They may be merely commensals. It is not improbable, indeed, that there may be more than one etiological factor at work.

Other microorganisms have also been incriminated. Certain continental workers have recently made out a strong case for the tubercle bacillus, notably Loewenstein, of Vienna, and Courmont, of Lyons. The former reports[8] that in nearly three hundred cases of acute polyarthritis virulent tubercle bacilli were found in the blood and in the fluid from the joints. Also Loewenstein and

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Amersbach found tubercle bacilli in the tonsils in rheumatic patients and in the Aschoff bodies in the heart in cases of recurring endocarditis.

Certain analogies between the arthritic manifestations in serum sickness and those of rheumatism, and the facts that a considerable variety of unrelated microorganisms have been found in the blood of patients with acute polyarthritis and that there are notable discrepancies between the clinical activities of the different strains of streptococci, have given rise to the suggestion that rheumatic fever is an allergic phenomenon. This view is supported by the work of Homer Swift[9] in the United States and Klinge[10] in Germany.

It would be singular if the theory of virus causation had not been advanced. De Vecchi (1912), Natali (1923), and Gräff (1929) have produced experimental proof in favour of this thesis, but other observers, such as Miller (1924), and Gross, Loewe and Eliasoph (1929), have been unable to confirm their results. Recently, Schlesinger, Signy, and Payne[11] have revived the idea, suggesting that infection with hæmolytic streptococci, by producing a condition of increased tissue susceptibility, enabled some as yet undiscovered causal agent (possibly a virus) to enter the body, or allowed such agent, if already there in a latent condition, to assume an active character. This suggestion was followed up by Schlesinger, Signy and Amies,[12] who have attempted to get experimental evidence in its support. They believe that they have succeeded. In deposits obtained by high speed centrifugation of pericardial fluid from cases of acute rheumatic pericarditis they obtained particles which morphologically resemble virus elementary bodies. Suspensions of these were specifically agglutinated by the sera of persons suffering from and successfully resisting acute rheumatic infection. Completely negative results were obtained with the sera of normal persons and of patients suffering from various non-rheumatic infections.

Dr. Alfred C. Coles, of Bournemouth, has published corroborative evidence[13]. In a pericardial exudate from a case of acute rheumatic fever with pericarditis he was able to demonstrate the presence of virus-like bodies, and subsequently, in three out of five fluids taken from the joints in cases of rheumatoid arthritis found very numerous virus bodies resembling those found in the first-mentioned case. Unfortunately for the theory of a specific virus causation for rheumatism Doctor Coles found similar bodies in the pericardial exudate in one half of fifty cases of patients who had died of the most varied conditions—accident, sepsis, malignant tumours, leukæmia, hydrocephalus, meningitis, and some others.

The study of virus diseases is extraordinarily difficult and presents certain problems analogous to those connected with streptococcal infection. Thus, many virus diseases appear to be distinct and specific, both in their spontaneous incidence and their clinical course, and, yet, experimentally, it is possible to break down their specificity and establish one and the same agent as the etiological factor for apparently distinct entities. For example, the studies of Van Heelsbergen on fowl-pox and of Zwick on stomatitis pustulosa contagiosa in the horse have shewn that these two diseases are closely allied to one another, and also to Jenner's horse-pox and other animal variolas. C. G. Pandit,[14] too, believes that, by means of the inoculation of calves and the subsequent passage through calves and monkeys back to calves again, he has from the infective material of epithelioma contagiosum in fowls developed a strain of vaccinia virus capable of producing the typical lesion and conferring immunity to infection with vaccinia virus. Many paradoxical phenomena have been observed during the experimental investigation of virus diseases, and it may very well be that tissue derivatives or other extraneous substances, when inoculated along with the virus, may condition the pathogenic power of that virus. The same remark may be

9. SWIFT, H. F.: Rheumatic fever, *J. Am. M. Ass.*, 1929, **92**: 2021.
10. KLINGE, F.: Ueber Rheumatisms, *Klin. Wchnschr.*, 1930, **9**: 586.
11. SCHLESINGER, B., SIGNY, A. G. and PAYNE, W. W.: Further studies on the ætiology of acute rheumatism, *The Lancet*, 1935, **1**: 1090.
12. SCHLESINGER, B., SIGNY, A. G. and AMIES, C. R.: Ætiology of acute rheumatism, *The Lancet*, 1935, **1**: 1145.
13. COLES, A. C.: Virus bodies in the pericardial fluid of rheumatic fever, *The Lancet*, 1935, **2**: 125.
14. PANDIT, C. J.: The relation of the virus of contagious epithelioma of fowls to the virus of variola and that of vaccinia, *Indian J. Med. Res.*, 1927, **14**: 885.

made about streptococcal infection in rheumatism. All of which goes to indicate the complexity of the problem which confronts the student of rheumatism. Many factors, evidently, enter into the etiology of this baffling disease. Allergy may still be invoked as the harmonizer of the discordant elements. The sensitizing agent may be the toxin of a specific microorganism, a virus, a non-specific microorganism, or even a non-bacterial or non-specific protein. Clearly, we have not yet established the exact situation.

A.G.N.

GROSS ANATOMY IN THE MEDICAL CURRICULUM

THERE is at present in Great Britain a strong desire for changes in the medical curriculum, a desire indicated in two recent reports—one issued by the London University Curriculum Conference[1] and referred to in our London Letter for July of this year; the other by the General Medical Council[2]. These two reports naturally embody largely the recommendations of teachers rather than of practitioners, whereas the British Medical Association Committee, which reported last year,[3] represented both branches of the profession. It is instructive to note that the recommendations of the latter committee were in various respects more progressive and radical than those of the other two. Although any resulting changes in the British regulations will not have a great direct effect on Canadian curricula it is not unlikely that they will stimulate questions regarding our medical courses, and in that case it would be well to note that the British Medical Association report shows the value of well-informed criticism by practitioners. To be well-informed, however, those of us whose graduation day is already far behind have to realize that Canadian medical teaching is much less like that of Great Britain than formerly. In fact, some of the proposed alterations have long been in force here. We must also realize that, even where the name of a subject of instruction is the same, the method and content are frequently very different from what they used to be. An example of this is the subject of Anatomy, which, hemmed in nowadays by numerous new competitors, naturally received much attention from the three committees.

As a preliminary to any criticism it is desirable to note how much time is now devoted to gross anatomy here and elsewhere. From university calendars one can usually form only a rough estimate of the total hours devoted to pure gross anatomy. Such estimates for seven leading schools in the United States are respectively: 220; 256; 360; 360; 360; 395; and 440. These figures exclude time spent on gross anatomy of the brain because most schools treat this with histological neurology in a separate course. Applied anatomy is also excluded. Courses in this branch of the subject vary in length, but it cannot be said that, as a rule, a short course in pure anatomy is compensated for by a long course in applied anatomy. On the same basis Edinburgh,[4] as representative of British schools, spends about 760 hours, and the Canadian schools are estimated to spend, respectively, 480; 530; 589; 620; 667; 680; 825 and 960 hours.

As regards the subject matter of gross anatomy most of us in Canada have been trained largely in the British tradition, or rather what was for a long time the British tradition—the tradition that anatomy is concerned with structures found in the dead body and that function should be left to the physiologist; a tradition of clear, dogmatic, detailed statements regarding the configuration of bones, the attachments of muscles, and the relations of structures to each other, with little indication that normal healthy persons vary enormously in the details of their structure. The aim of British anatomy has been predominantly to provide a tool for the surgeon, whereas American anatomy has for a long time been almost synonymous with biology, thus providing a useful basis of general conceptions for medical training,

1. The Medical Curriculum—Report of the Conference, *Brit. Med. J.*, 1935, **1**: 1040.
2. The Medical Curriculum—Report by G. M. C. Committee, *Ibid.*, 1935, **1**: 1222.
3. Report of Committee on Medical Education, *Ibid.*, 1934, **1**: Suppl. 192.
4. We are indebted to Dr. E. B. Jamieson of the Edinburgh University Anatomy Department for this estimate.

but with a serious lack of gross human anatomy. In Canada for a number of years the influences of both British and American methods have been at work, and there are signs that in Great Britain the teaching of anatomy is returning to the earlier viewpoint of John Hunter and is showing that anatomy can and should have broad biological and physiological interest without neglecting detailed structural knowledge, where necessary. There are two reasons why it is unwise to leave all teaching of function to the physiologist: first, because it is bad, pedagogically, to describe an organ without mentioning what it does, and, secondly, because the modern physiologist is concerned chiefly with functions of tissues. The anatomist therefore appropriately deals with the functions of organs acting as a whole. The modern anatomist aims at teaching about bones as producing and affected by stresses; about muscles as they really act in the living body and not as their attachments would allow them to act (a very different matter); about arteries, in regard to their ability to maintain a circulation when others are ligated or blocked; about sensory nerves to the skin—the information given by paralysis and not the mere position of the nerves; about the shape and position of the heart in relation to body-build and chest-shape; about the shape and position of abdominal viscera as seen by fluoroscopy, *i.e.*, as affected by posture, respiration, body-build, and even the emotions; about the living arch of the foot and the factors responsible for maintaining it; and about ossification dates, not as examination puzzles with some medico-legal value, but as important indicators of a child's development, and correlated with psychological as well as with physical growth. All these examples are concerned with knowledge which is continually growing, and this makes anatomy as much alive as any other medical science, in strong contrast to the apparently well-established body of fact comprising the ordinary anatomical text-book. Even this apparent impregnability of text-book statements will, however, become less real to anyone who compares statements from book to book and who inquires how many individuals formed the basis for the statements. From time to time medical or surgical interest prompts anatomical investigation and it is then not uncommon to find much wider normal variation than the text-books imply and that even the commonest or average arrangement differs from text-book statements.

Enough has been said to show that modern anatomy is more than a tool for surgical technique. It forms a basis for pathology, neurology, pædiatrics, orthopædics and radiology, as well as for general medicine and for modern surgery, which is more than a technique. Anatomy contributes also to preventive medicine, because that subject is concerned partly with the varying incidence of disease in the different anatomical types of person, with posture as a means of promoting health, and with hereditary factors in disease. As preventive medicine develops it will be more and more concerned with the boundaries between the normal and the slightly pathological, and the anatomist as well as the physiologist has to demonstrate the wide variation compatible with normal health.

It may, of course, be said that many of the topics mentioned above can be left to the clinical teachers—that the orthopædist can teach about the normal arch of the foot, the radiologist about the normal position of the viscera, and so on. Of the several objections to this, the chief is that it has been repeatedly shown to be hard to eradicate dissecting-room impressions, and that these have led to serious misconceptions in clinical theory and practice.

Finally, it may be asked whether all this new information will not exclude some of the old useful surgical anatomy, especially in schools where time is limited. At such schools it is not easy to strike a just balance, but it should be emphasized that much of this newer material consists of correct instead of incorrect conceptions, ideas instead of masses of detail, and indications where information can be found instead of the full information itself. Economy of time can be introduced by careful selection, so that the student learns what is most likely to be of value to him, and learns it thoroughly in the form in which it is used in current clinical work, with special emphasis, for example, on the anatomy of the minor operations that a general practitioner performs and on the anatomical relationships that are actually

used in the diagnosis of disease. In such a course, unless cut too short, the manual dexterity which dissection promotes can still be acquired and it is even found possible to add to it a little practice in the making and systematic recording of observations—a training of wider value than the mere learning of systematic statements from a teacher or a text-book. It will thus be seen that modern anatomy aims at developing the mind instead of merely burdening the memory, and tries to give what the London University curriculum report desires—"a grasp of the constitution of the human body as a whole and of the structure and function of the essential systems". DONALD MAINLAND.

Editorial Comments

Mortality Statistics for Canada

It is a fact at least worthy of noting that Canada only came of age as regards its system of vital statistics in the year 1921, and even then a national system was lacking, for the Province of Quebec continued to compile its statistics independently until 1926. So then, only for the last nine years has there been a uniform system for compiling vital statistics for the whole Dominion. Nor was it for lack of efforts on the part of our Association; the establishment of a Bureau of Vital Statistics was one of the very earliest suggestions made by the Association to the Dominion Government, and repeated again and yet again.

At the moment, however, we wish to draw attention to a special report from the Dominion Bureau of Statistics on the mortality from 1921 to 1932, with the figures for 1933 in an appendix.* It is pointed out that the proportion of children in Canada is becoming less, whilst that of aged persons is increasing; that is, we have an aging population. In 1921 the proportion of children under 5 years was 12.06 per cent of the total population: in 1931 it had declined to 10.35 per cent. On the other hand, the proportion of the population between 40 and 60 was 18.30 per cent in 1921, and 20.12 per cent in 1931, whilst the proportion of those over 60 increased from 7.52 to 8.38 per cent in this period. One of the most marked effects of this aging is on the statistics for cancer. In this 10-year period the crude rate for cancer has increased by 27 per cent. The standardized rate however adjusts this to only 12 per cent: the increase in large part therefore is apparent only.

Other diseases in which this aging must be taken into account in judging statistics are: diseases of the heart, whose crude rate showed an increase of 25.5 per cent, the standardized, only 9 per cent; diseases of the arteries, 71 per cent and 50 per cent respectively; nephritis 28 per cent and 12.5 per cent. These latter diseases are of course naturally associated with increased age, but the mortality from diabetes also shows an advance in the older groups, due to the aging of population mentioned. The increase was 22 crude and 10 per cent standardized.

Tuberculosis is the only major disease whose mortality rate seems to be little affected by the aging of the population. Between 1921 and 1932 the decline in its crude mortality rate was 22 per cent, in the standardized, 22 per cent. One other point in respect to the tuberculosis mortality rate is that it is so much higher amongst the Indian population that the rate for the population as a whole is considerably affected by it. Thus, if we compare the years 1922 and 1932 the rate inclusive of Indians fell from 73.0 per 100,000 to 55.2 per cent, a difference of 17.8, but exclusive of Indians the rate fell from 69.1 to 46.6, a difference of 22.5 per cent. H.E.M.

* Special Report on Mortality in Canada 1921-32. Published by Dominion Bureau of Statistics, Ottawa, 1935.

The Canadian Health Institute, Incorporated

The medical profession of Montreal was circularized during the month of August by the Canadian Health Institute, Incorporated, a body incorporated under the laws of the Province of Quebec to sell medical care to its members. Membership is unlimited, provided the entrance fee is paid, plus the payment, in advance, of the required premiums. Just what these premiums amount to is not stated. The member secures the right to consult the physician of his choice if (and this is a rather big IF) the said physician is affiliated with the Institute. Requests for home calls must be made through the Head Office of the Institute. Special examinations and laboratory services are to be secured at the Head Office. Hospital care in affiliated hospitals is to be provided. "The board of directors elected by the shareholders are well-known business men of Montreal" who have a "personnel of well-trained agents, both English and French, to sell the contracts to the public".

This plan promises all the evils which grow out of the sale of medical services for profit. Just why a group of business men should be incorporated under provincial law to make money out of selling the professional care given by the medical profession is hard to understand.

True, it is said that any physician may affiliate, but if he does so, then he accepts a medical tariff devised to make profit for shareholders. He must refer his patients to the Head Office for this and that; for example, the periodic health examination is not to be made by him but at the Head Office.

The bait held out to the medical profession is that fees will be paid, and that "although the Institute permits its members the choice of Physicians and Hospitals (only if affiliated), there will be a fairly large percentage of our members without a family physician (affiliated), in which event, the Institute will be at liberty to suggest one. This will enable us to add paying patients to your clientèle." The brackets are mine.

The medical profession should stand firmly, without compromise, against any plan which interposes a third party between patient and doctor in professional matters. There is no reason in the world why any business group should be allowed to exploit the medical profession for profit. The least the province might do is to cancel the incorporation. The profession can protect itself by refusing to have anything to do with the Institute. G.F.

The Victorian Order of Nurses for Canada

The Canadian Medical Association as a national organization which has accomplished a great deal in welding a scattered profession, members of local associations, into a united body, has a particular interest in and sympathy for the Victorian Order of Nurses for Canada, an affiliated organization which is peculiarly Canadian.

The last issue of the *Journal* presented an article on the work of the Order by its Chief Superintendent, Miss E. L. Smellie, who is as well and favourably known in all parts of this country as is the Hon. Senator George P. Graham, distinguished President of the Order. The only criticism ever heard of Miss Smellie is that she is unduly influenced by the medical profession!

The medical profession enjoy the advantages of having the visiting-nurse service provided by the Order in some eighty Canadian centres. A high quality of nursing care is assured through an adequate system of supervision. No patient is received for nursing care unless a medical practitioner is in charge of the patient. No patient is ever refused because of inability to pay, but each one is expected to contribute, within his means, in whole or in part, the cost of the nursing care provided. The Victorian Order service is limited neither to the poor nor to maternity nursing as some physicians have believed.

Medical practitioners might well ask themselves if they are using the Victorian Order as fully as they might for the benefit of their patients. If they practice outside the areas now served by the Order should they not do something to promote the organization of a local branch for the benefit of their patients?

G.F.

Corrigendum

In the September issue of the *Journal* (page 272) we published an article by Dr. Franklin N. K. Falls, entitled "The Perineum at Childbirth; Reinforcement of Tissues and a Fulcrum Principle". Owing to some misunderstanding it was stated that this article emanated "from the Department of Obstetrics and Gynæcology, McGill University. Dr. Charles F. Martin, Dean of the Faculty of Medicine". We are asked to say that this statement is incorrect. Neither the Department mentioned nor Doctor Martin has any responsibility in the matter. The article in question is entirely Doctor Falls' own. We regret the mistake. A.G.N.

A QUANTITATIVE STUDY OF VASOCONSTRICTION INDUCED BY SMOKING.—R. S. Lampson determined the rate of peripheral blood flow in man by recording the changes in the hand volume. For the first half hour of each experiment records were made to determine the normal blood flow of the subject. The patient then smoked, and further records were made during and after the period of smoking. The experiments have shown that smoking brings about a sudden marked reduction in the rate of the peripheral blood flow, an elevation of blood pressure, and an increase in heart rate. Haggard and Greenberg have recently observed that smoking also elevates the blood sugar level. These reactions induced by smoking appear to be manifestations of the response of the sympathetic nervous system to mild stimulation. In all the experiments, the blood-flow reduction was greatest immediately after smoking. The degree and duration of the vasoconstriction could be correlated with the amount of nicotine absorbed. When a cigarette was inhaled, the rate of peripheral blood flow was at least halved and remained partially depressed for about sixty minutes. If the smoke was not inhaled, the vasoconstriction response was almost as great but the reaction lasted only fifteen minutes. "Denicotinized" cigarettes produced a less marked and shorter response than ordinary cigarettes. Pipe smoking gave rise to moderate vasoconstriction during puffing and to a marked reaction after inhaling the smoke. One experiment with a cigar demonstrated the vasoconstrictor response. Patients with thrombo-angiitis reacted to smoking in the same manner as the normal subjects. There is no evidence from these experiments that smoking is an etiological factor in thrombo-angiitis obliterans, but it seems clear that smoking must have a deleterious effect on patients who have already acquired the disease. If such a patient should smoke one cigarette an hour he would depress his peripheral circulation during the entire day. It is of the utmost importance that patients with thrombo-angiitis obliterans should forego the use of tobacco, as it adds unnecessary insult to the already existing injury by further increasing the peripheral circulatory insufficiency.—*J. Am. M. Ass.*, 1935, **104:** 1963.

Special Articles

THE ENVIRONMENT OF CELLS AS A FACTOR IN TUMOUR GROWTH*

BY THEO. R. WAUGH

Montreal

William Bayliss is reported to have made the rather paradoxical statement that we would soon be further ahead in our knowledge of immunity if we could forget all our present ideas about it. Similar suggestions appear from time to time in other fields. Such for instance is the effort recently made to have the term "inflammation" dropped entirely from our nomenclature. Now while these ideas are, of course, put in a manner of exaggeration, there is sufficient truth in them that they cannot be dismissed as ridiculous. This truth hinges upon the quite obvious fact that our progress in knowledge of a particular subject quite frequently reaches a stalemate. We are like masons, who instead of laying a foundation on which they may build indefinitely upward construct an arch and when the two sides meet are unable to proceed further. The trouble in such cases is not in the building material, that is, the single points or facts which have been added to our knowledge, but in the whole fundamental plan or foundation hypothesis, and there is only one thing to do in order to proceed farther, either to tear the structure down or disregard it and start over again. There are innumerable examples of such a situation arising in medical science. Take, for instance, pernicious anæmia before the discovery of liver therapy, and consider the tremendous amount of work which was done in an effort to link up its etiology with bacterial toxins from the small intestine. And the most astonishing part of it is that much of this work appeared quite conclusive. Fortunately, a new foundation has started an entirely different line of approach to its problems.

Similarly, to my mind, a quite apparent stalemate exists in the attempt to advance our knowledge of the tumour problem by a study of the neoplastic cells themselves. I mean that line of investigation (and it constitutes a high percentage of the whole) which is built upon the hypothesis that tumour cells are essentially different from immature proliferating body cells, that they in themselves have acquired something foreign to normal cells, and that they constitute an autonomous entity. I do not mean to imply that I am not cognizant of the large number of interesting and important facts which have been learned by this method of approach, but the point is,–is it leading to clarification of our ideas or the ultimate solution of the tumour problem. Haven't we just about reached a standstill? It seems to me that this is the case, though many, of course, will not agree. However, if we assume that we have placed too much emphasis upon the hypothesis of the autonomy of tumour cells, there remains one other course open to us, namely, to make a fresh start along different lines, uninfluenced by former conceptions, no matter how contradictory they may be. If we are to accept such a challenge, let us at once put aside all consideration of "specificity" in tumour cells or of their relation to foreign agents, such as filterable viruses, etc., and consider them strictly from the standpoint of body cells. In other words, let us approach the problem along the fundamental biological laws of cell proliferation and growth itself. Fortunately, there are many facts in the realms of general biology and embryology which are far from discouraging to this attempt, many of which point to the dictating control of environment upon cell activity.

According to the so-called "epigenesis" theory of development, which has replaced the older preformative ideas in embryology, growth of the fertilized ovum is a series of events dictated by the environment and by the relation of the proliferating cells to each other, and only modified to a lesser degree by the hereditary characteristics of the cells themselves. Each chain of events results from previous events and bears a causal relation to the changes which follow. As Huxley and De Beer put it,—"There can be no question of preformation, for the structures of the future organism are not there, nor are their positions localized or determined in the unfertilized egg. This epigenetic character of development is based on the capacity of the protoplasm of the egg to react in a particular way to certain stimuli which in the first instance are external, as when the egg-axis and plane of bilateral symmetry are induced, and then, later, internal, as when the tissues are induced to differentiate under the influence of an organizer. The whole of development is a series of such reactions or responses to stimuli. It therefore follows that no development can be normal in an abnormal environment, and, also, that the hereditary endowment of an organism, represented by the inherited factors transmitted to it by its parents, is by itself insufficient to account for development. Development is always the product of an interaction between a specific protoplasm and hereditary outfit on the one hand, and a particular complex of environmental factors on the other. The environmental factors operative with regard to any part of the organism are partly those of the external world, partly those of the internal environment provided by the rest of the organism." Thus we now realize in the earliest stages of development, when one might most expect a controlling force within

*Read in somewhat abbreviated form before the Osler Reporting Society, Montreal, December 28, 1934.

the cells themselves, the dictating power of the environment.

In the field of experimental embryology there are innumerable examples to illustrate this point. I shall mention one or two. If the fertilized ovum of the newt is allowed to proliferate under glass where pressure can be exerted it is possible to transpose nuclei from one area of cytoplasm to another. They thus become the nuclei of quite different cells from those to which they originally belonged. Nevertheless, the development of embryos so treated and then released from pressure proceeds as if no change had taken place. This indicates that it is quite immaterial, at this stage at least, whether any given nucleus, which is the bearer of the hereditary factors, finds itself in one particular cell or another. Further, it has been demonstrated repeatedly in the later stages of development of the embryo that it is possible to transpose cells from one area of the embryo to another and have them, under influence of the new environment, take on a quite different line of development. Cells destined to become epiderm when transposed to the brain become quite normal nerve cells and *vice versa*. The characteristics of the cell are a function of its position in the whole.

As development proceeds, environmental stimuli bring about differentiation of the cellular elements in various districts. This change is principally an alteration in the cytoplasm, and with it goes a greater and greater loss in proliferative activity. Growth appears to be a function of the nucleus, while specialization of the cell rests in the cytoplasm. All body cells have the same inherited elements in the chromosomes of their nuclei, but the form and structure has been moulded and dictated by the environment. Even nervous stimulation is not necessary for complete differentiation or even abortive functional activity, as demonstrated recently by Holtfreter in exogastrulated embryos devoid of any nervous system. It would appear that its nurture determines the nature of the cell. Finally, a stage is reached where certain elements as muscle and nerve cells have lost nearly all proliferative activity, others retain slight powers of multiplication, while in certain districts, as in the stratum germinativum of the epiderm and in the hæmatopoietic tissues, an active formation of new cells persists through life, but only because in these areas certain cells remain in a relatively undifferentiated form. Once a cell has differentiated, its cytoplasm has undergone changes which limit its potentialities and hence determine its future possibilities. In slight differentiation the action may be reversible, but once sufficient change has taken place this ceases to be the case.

Turning to the field of tissue culture we find many interesting observations in support of this same general idea. Fibroblasts may be removed from the heart of a chick embryo and cultivated for years without any evidence of differentiation, provided the same environmental conditions are maintained. This is done by repeated transplantations. Moreover, there seems to be no limit to the potentiality of this growth, and multiplication is as rapid after ten years as it was at first, and the general characters of the culture and the cells themselves are not altered during this period. Had such a fragment of tissue which has been removed from the embryo remained in its native site it would have gradually differentiated into fibrous tissue and in due time ceased to grow, not, however, because of any inherited control in the cells themselves but because of influences set up by environmental alterations. Moreover, it has been demonstrated by Drew that a pure growth of epithelial cells which proliferate in tissue culture shows no tendency to arrange itself in glandular structure, as tubes and columns of cells. Merely a mass of proliferating elements results. However, if connective tissue is added the picture entirely changes and the epithelial cells take on a distinct organoid arrangement. Growth is obviously inherent in the cells themselves, but alteration and differentiation are dependent upon the influences of the surrounding medium.

Nor is this endless ability for reproduction confined to simple cells. Woodruff, with his pedigreed race of paramœcium, has demonstrated that it is likewise true of relatively complex protozoa. These organisms multiply several times in twenty-four hours, and by daily transfers of a single individual to fresh media he has preserved this proliferation over a large number of years. In fact, computation of the results, had all lines been preserved, shows that, theoretically, not only would the entire world have been converted into paramœcia but the paramœcia would have filled the known universe.

We are inclined, in this connection, to speak of the infinite potentiality of reproduction. But this is not a very apt term, for potentiality implies energy to be dissipated. Such is not the case here. Reproduction is the consequence of a proper environment upon living cells and is not the result of a stored-up force within the organism. It is as natural for this to occur, when conditions are right, as for bacteria to grow when placed upon a culture medium.

If we are willing to accept, therefore, what seems indisputable, that proliferation is the natural consequence of cells in a proper environment, and that differentiation and loss of this ability is likewise the result of environmental influences, we can only conclude that cessation of growth in the higher animals, as man, is due to this same influence carried to a very high degree. Some cells because of extreme differentiation have lost the ability to multiply, most retain it to a certain extent, while others continue active division to supply the needs, but all are under an environmental control. They are curbed, but they still possess, unless too highly weighed down by differentiation, that inherited proliferative ability which will manifest itself as soon as the inhibiting influences are not maintained.

Once we accept this conception of growth and its restraint by environmental influences, we get a quite different perspective of many biological and pathological problems. The burden of explanation is placed on a different phase of the problem. The important thing is no longer why do we grow, but why do we stop growing; not why does a wound heal, but why does growth cease, once the defect has been repaired. And, as regards tumour growth, the question and marvel is not, why do we get tumours, but, rather, why are they not much more common than experience proves them to be.

Concerning the exact mechanism by which this environmental control works we have practically no knowledge. We can get an insight into it only through observation of its effect upon cells. We can study the results of its influence and the changes which take place when it is disturbed. We know, for instance, that its first influence upon a cell is of chemical nature,—chemo-differentiation, and this is followed by morphological changes, — histo-differentiation. But exactly how this influence is exerted is a mystery.

If we attempt to approach the problem from the standpoint of the prerequisites for cell proliferation we likewise do not get very far. It is obvious that it is necessary that the cell shall not have reached too high a degree of differentiation, and, secondly, that it shall be properly nourished, but in addition there is the need for alteration of those influences in the environment which have held it in check. These it seems may be modified through physical or chemical changes which are brought about in several different ways, as, for example, by hormonal, trophic and neurovascular factors, and by disturbance of the normal tissue continuity. Surprisingly little, however, is known positively about this important subject.

Now, when we come to the various subjects which concern the pathologist more particularly, and apply the principles which we have already laid down, we find that they appear in a quite different light. This is true of all changes involving proliferative activity, such as regeneration, wound healing, inflammations, hyperplasias, kataplasias, and especially the neoplasias. We shall have to pass over most of these, however, and confine ourselves to the subject of our paper, namely, "tumour growth".

As we have stated above, our problem now becomes, not why do certain cells of the body take on a peculiar and particular neoplastic tendency, but, as we have discarded all ideas of specificity and autonomy, rather, why are certain cells allowed to dedifferentiate and grow in an unrestrained manner. If our hypothesis is correct this must be due to a loss of the normal environmental control. Therefore, let us see how some observations, more particularly those on the malignant growths, such as cancer, support such a view.

If one examines a single specimen of cancer, as, for instance, from the breast, it may be quite difficult to arrive at a conception of the mechanism of its development, but if one is examining repeatedly numerous specimens, one soon becomes satisfied of the positiveness of two facts—first, that the growth does not arise from a single cell, and, secondly, that it is preceded by other proliferative epithelial changes which are of purely hyperplastic nature. As a rule, quite obviously, either focal or, often, diffuse disturbance of the relations between the fibrous stroma and the parenchymatous lobules occurs first. The ducts often atrophy or become dilated, forming cysts, and with this goes an increase in fibrous connective tissue; the normal continuity and relations of the ducts to their surrounding stroma are distinctly disturbed, with production of profound local architectural alterations. Should there then occur, as frequently, a regeneration of the epithelial lining cells, these newly-formed cells proliferate in a distinctly abnormal environment. They are highly differentiated and in no sense cancer cells, but they soon show a partial loss of the normal regenerative control, in that they tend to rise in papillary folds into the lumen. Restraint may check the process here, or it may go further, and the cells pile up in several layers within the ducts. I have seen breasts filled with such areas; still, there was no cancer and in such cases never a sign of metastatic growths in the axilla. Proliferation may remain confined within these limits, apparently indefinitely. But, more frequently, in a single or in multiple districts the proliferative activity is not restrained and the growth proceeds beyond the limiting membrane into the surrounding tissue where epithelial cells should not exist. With this alteration of their environment the cells rapidly dedifferentiate and become distinctly cancerous. But their immediate ancestors were not malignant cells, but merely relatively highly differentiated hyperplastic epithelium, which, however, was not sufficiently restrained to check proliferation. It is the change in environment which has allowed them to become cancer cells. As to the primary cause for both the involutionary and proliferative changes in the breast it seems likely that it is hormonal in nature.

It has always seemed to me extremely difficult to explain those cases where a breast has been removed for cancer and, years later, a recurrence occurs. We have had them after a period of seventeen years. It is impossible to conceive of actively proliferating cancer cells remaining as such during that length of time, but the process becomes intelligible if we understand that a nest of these cells may, because of the profound tissue changes associated with the operation, be brought under environmental control and continue as dormant and restrained epithelial elements, with later loss of this inhibition and the renewal of activity. I recall some years ago a case of carcinoma of the cervix, with wide lateral extension, in which it was demonstrated histologically that the line of excision went through the cancer tissue. This patient received no post-operative radiation,

was alive and well when last heard from several years later, with no evidence of a farther spread of the growth.

Studies of carcinoma of the rectum, particularly early cases, show us that the chain of events leading up to the actual cancer is in a general way similar to that met with in the breast. There apparently first occurs an area of hyperplasia in which the high cylindrical goblet cells of the mucosa take on an excessive proliferation, with, however, a relatively high degree of differentiation. These cells lie regularly upon the surface, but tend by crowding to rise in papillary folds. The proliferation spreads laterally along the surface and then extends down into the crypts of Lieberkuhn. Eventually a picture is established which conforms to a benign adenomatous growth, and certain cases teach us that the cells may be thus restrained and emancipation proceed no further. However, more commonly, and apparently after the surface and crypts in an area have been covered by the newly formed cells, these are displaced into the lamina propria, where they rapidly assume malignant properties and a cancer is developed. It is interesting to note that the speed with which this change takes place seems to vary greatly in different cases. In some the cancer develops in a local area before extensive hyperplastic changes have taken place, but in many cases the lesion may be extensive, with only a single small area of actual cancer growth, and it is not uncommon in certain cases to find the benign type of proliferation continuing at the periphery after cancer has developed at the centre of the growth. Similarly, in the lip a wide area of hyperplasia of the overlying stratified squamous epithelium, with a downgrowth of finger-like processes into the corium, frequently precedes any evidence of malignancy. And when cancer at last develops it is quite obviously not derived from a single cell but often from a quite large area with multiple points of emancipation, and, it would appear, in some cases, a spreading of this emancipatory process into adjacent hyperplastic districts. It is these changes leading up to cancer which have lead to the introduction of the term "pre-cancerous". Granted this is not a very satisfactory diagnosis to the surgeon, nevertheless it no doubt defines a distinct stage in the process of its development. Many more examples of the steps leading up to cancer might be quoted, but this should suffice to establish quite conclusively that the balance of evidence in the examination of early carcinoma is against its origin through the sudden emancipation of a single cell.

Some insight into the possible nature of certain of the environmental changes that appear to play such an important role in the development of neoplastic growths has been offered through the observations of Kreyberg. He has shown in experimental tar cancers of the skin that there first occurs a marked hyperæmia of the vascular bed, with increased nutrition to the parts and hyperplastic proliferative changes in the epithelial cells. This is followed by a permanent dilatation of the vessels, with apparent loss of their power of contraction. A continuous and uncontrollable hyperæmia is thus established, and the epithelial activity then takes on the form of warty excrescences. Thrombosis then occurs in some of the dilated vessels, with the result that areas previously over-supplied with nutrient material and oxygen are suddenly deprived of a great deal of both. This leads to necrosis of the warty epithelial tumours in some areas, but in others proliferation continues, but, now, the growth becomes incoordinated and a cancer results. We have therefore here certain morphological evidence to support the view that environmental changes brought about through vascular disturbances are an important factor in this process.

Now, as we proposed at the start, we have brought together a certain amount of evidence from the fields of general biology, embryology and pathology to support an hypothesis that tumour growth is nothing more than an expression of the natural inherent proliferative activity of body cells, not too highly differentiated, as the result of changes in environmental influences. I think you will agree quite a case can be made out for such a theory, though we have by no means exhausted the evidence. I do not wish for a moment to imply this is an entirely new idea, for, on the contrary, it has existed in one form and another in the writings of various authors. In fact, it embraces many of the features of the time-honoured theories of tumour growth. It does not oppose the importance of irritative causation, as laid down by Virchow, but sees in that stimulation the setting up of proliferative changes in the tissues and disturbance in the environmental control. Moreover, it agrees with Ribbert's conceptions of the effect of displacement of cells from their normal continuity, but emphasizes finer and more fundamental changes in environmental influence than the mere transposition of cells. It is willing to accept with Cohnheim that certain tumours arise from embryonic "rests", but for the reason that here exists an anomalous tissue relation, and hence a predisposition to neoplastic growth. In fact, the distinguishing feature of this hypothesis is purely in the giving up of any recognized specificity in the tumour cells other than that resulting from the effect of an altered environment upon proliferating elements.

So far we have purposely avoided contradictory evidence, and I am quite aware there is a great deal. Some of this can be answered; much of it, at present at least, can not. I should like, however, to bring up just a few of these points which touch upon the morphological and metabolic aspects of the question.

It is quite obvious that tumour cells are not the same as embryonic body cells; some at least have distinct morphological characteristics. However, in answer I would say that as they are derived from more highly differentiated cells, it is only natural, once this differentiation has taken

place, that the reversion to a more immature form would not necessarily be accompanied by a complete transformation to the original embryonic type. In fact, embryological evidence all points to the difficulty of removing changes in the cytoplasm, once they have been firmly established in the differentiated element. Moreover, lack of identity between embryonic and neoplastic cells is no refutation of the hypothesis that the environment is the cause of the production of the atypical immature elements.

Secondly, we find, particularly from the fields of genetics, that changes have occurred in the chromosomes of the cancer cells, and it is therefore held that the growth in a malignant tumour has lost its coordinated character owing to injury to the chromosomes. Now, it is true that this chromosomal defect is handed down from one cell to its descendants, but experience in embryology shows that such a defect, while it may alter the inherited characteristics of the mature organism, in no way renders its development incoordinated. Moreover, it has always seemed to me difficult to draw a line as to where this chromosomal change occurs. If it is present in an adenocarcinoma of the endometrium, is it also present in the malignant adenoma, or in the simple adenoma, or in the glandular polyp, or in the simple hyperplasia? There is, obviously, no sharp line between these different degrees of proliferative activity.

The atypical manner of growth of neoplasms, and, more particularly, the metastasizing properties of malignant tumours, have led to the common use of the terms "aggressive" and "autonomous" to express these distinguishing characteristics. Now, no one can dispute that neoplastic cells behave differently from normal body cells, but it is quite another matter to endow them with such independent and wilful powers as these terms imply. For "aggression" signifies an act of hostility, which is quite beyond the attributes of any body cell, and "autonomy" implies a disregard of law, here, presumably, natural law, which cannot be even conceived of in this connection. If neoplastic cells behave differently from body cells it is not because they are hostile or lawless, but rather because in their unrestrained, but quite lawful, proliferative activity they possess certain distinct advantages.

Then we have the evidence of the specific metabolic properties of cancer cells. When Warburg demonstrated that cancer cells obtain their energy in a different manner from normal adult tissue cells, that is by glycolysis, with the splitting of sugar to lactic acid, it was felt that at last a distinct point of difference had been found. However, subsequent work by Fisher-Wasels has shown that in cancer cases not merely the malignant elements but the body tissues also show this change in their form of metabolism. He therefore recognizes two factors as necessary for tumour growth,—first, a local regenerative activity, and, secondly, a general body disposition, which expresses itself, in part at least, as this change in the form of metabolism. To illustrate by a specific example. If mice are treated by arsenic, tar, etc., they may develop cancers at the site of irritation, but not altogether because the epithelial cells have here been altered by the irritants; because if we cause a wound elsewhere on the skin, once this disposition has been established, a cancer will develop at the point of the simple injury. Thus what was originally held as a strong argument for the specificity of cancer cells becomes an even stronger argument for the influence of environment.

In closing, if you will permit me to draw a rather plain comparison, it may be helpful in bringing these points to understanding, though I am quite aware of the errors and misconceptions that arise on the basis of reasoning by analogy. It likens carcinoma to a runaway horse. Horses have developed from wild animals which roamed the prairie quite unrestrained. With domestication they have become differentiated into various types, even into draft horses, beasts of burden which have lost nearly all of their original vigour and high spirits. Some probably never could run away. Some remain more active and frequently shy and prance, but are held in check by bit and reins. However, if they are unusually stimulated, or if the harness gets old and breaks, or perhaps was not properly made at the first, they get from under control and run away. Now we stand at the curb and watch the event. Those who believe in specificity are trying to make out something peculiar about this animal racing down the street. They may think it is a zebra or something or other, and that a circus has come to town. Those interested in etiological factors are looking for what frightened the horse. They do not stop to remember that some horses get frightened every day, but only now and then is there a runaway. Those of us who look to the environment are trying to explain why the animal got out of control. And thus the surgical pathologist often finds himself in quandary to make up his mind whether he actually is looking at a "malignant" event. It is true that this is easy in some cases, but in others it becomes very difficult to draw a sharp line between a true runaway and just a frightened horse.

Medical Economics

THE COLLEGE OF PHYSICIANS AND SURGEONS OF BRITISH COLUMBIA

On September 20th the College of Physicians and Surgeons held an open meeting under the chairmanship of Dr. T. McPherson, Victoria, President of the Council. About two hundred doctors from all parts of the province attended. This very important meeting dealt with the matter of Health Insurance, at present a subject of the highest interest to the profession in British Columbia. The report of the Committee appointed by the Council to study the Draft Act on Health Insurance drawn up by the Provincial Government, and distributed for comment and criticism to all interested, was presented by Dr. W. E. Ainley, of Vancouver. This report has since been presented before the Hearings Committee of the Government, and is printed in full below.

Accredited delegates from each electoral district in the province, speaking in turn, made announcement that (1) they were opposed to the Act as at present drafted, and (2) that they were unanimously behind the Committee's report and would support the Council in whatever action it might take.

Resolutions were passed authorizing the Council to engage in such publicity as they saw fit, and formally asking the Canadian Medical Association for its support and assistance.

Dr. Routley, secretary of the Canadian Medical Association in addressing the meeting suggested that in approaching the government on the subject the following points should be made emphatically clear:

1. The plan as suggested for British Columbia in the Draft Act has not the support of the medical profession of British Columbia.
2. Actuarial data for British Columbia are not available.
3. It is said by the life-insurance companies of British Columbia that there are no actuarial data available for Canada.
4. We should propose that such actuarial information be secured.
5. The life-insurance companies of Canada have told the Canadian Medical Association that they are prepared to sit in with any Commission formed, and make, through their own actuaries, an accurate actuarial survey of Canada.

REPORT OF THE HEALTH INSURANCE COMMITTEE OF THE COUNCIL OF THE COLLEGE OF PHYSICIANS AND SURGEONS OF BRITISH COLUMBIA

As submitted to the Government Hearings Committee, on September 24, 1935

As a member of the Council of the College of Physicians and Surgeons of British Columbia, Dr. W. E. Ainley was appointed Chairman of the Health Insurance Committee in May, 1935, with power to form the said Committee. This Committee includes: Drs. W. E. Ainley, G. F. Amyot, L. H. Appleby, B. W. Cannon, J. A. Gillespie, J. J. Gillis, B. D. Gillies, G. C. Kenning, J. H. McDermot, N. E. McDougall, R. L. Miller, F. N. Robertson, W. H. Sutherland, Wallace Wilson, and, also, Grant Fleming.

Duties of the Committee.—(1) To study the draft bill on Health Insurance submitted by the Provincial Secretary in March, 1935, and to make criticism and suggestions thereon.

The Committee feels that while it is incumbent on them to cooperate with the Government and make helpful suggestions wherever possible, in order to arrive at a satisfactory solution of difficulties, yet it is not their duty to attempt a reconstruction of the Bill. This would entail an amount of work which they are not organized to undertake at present.

2. To present our conclusions to the medical profession throughout the province for their approval and criticism.

3. To endeavour to consolidate the profession behind a unified opinion.

General principles.—In this study we have been guided by the following broad principles:

1. That Health Insurance is desirable both in the interest of a limited class of the public and of the medical profession.

There is a large class of people who refrain from seeking adequate medical care because of lack of money and fear of incurring expense. The care of the members of this class who have sought medical attention has, in the past, rested very largely on the shoulders of the medical profession, who thereby suffer financial loss. This responsibility of caring for the poor was in the past and under different social conditions willingly accepted by the profession, but with the lapse of time and under changed conditions it has become an intolerable injustice. Both the public and Governments have come to look upon it as a duty owed by the profession and seem to resent any effort on their part to right the wrong.

2. That only those who require help should be included in a scheme of Health Insurance,

and that these should be helped only in proportion to their needs.

3. That any approach to total State Health Insurance for the care of the sick is unjustified and unwise. That the efforts of the Government would be better expended, both from a financial and scientific point of view, in the extension of organized prevention and facilities for early diagnosis by the medical profession at large in the income groups above those indicated in paragraph 2 rather than in the treatment of disease.

4. That any scheme must be such that the scientific standards of medicine will not be lowered. This principle involves very largely the conditions under which the doctor works, the remuneration which he is to receive for his services, and the method by which this remuneration is made. The practice of medicine calls for a man of character and education, and the remuneration must be such that this type will continue to be attracted. This remuneration must at least be equal to that of other professions, for there is no other profession that requires such an outlay of capital and time in preparation. The conditions under which he works must be dignified and such that he can maintain the respect of his patients. The interests of the public and profession are not antagonistic in the above respects.

5. That the insured must be given adequate service and be made to feel that they are benefiting by the scheme.

6. That the personal relation between patient and doctor be disturbed as little as possible.

A Federal Commission.—Before going on to a discussion of the Act we wish to state that we strongly endorse the recommendation of the Council of the Canadian Medical Association as contained in the following resolution passed at their Annual Meeting at Atlantic City this summer:

> "Whereas it has been brought to the attention of this Council that the Minsters of Health of Canada, meeting at Ottawa, proposed that a Royal Commission be appointed to make a survey of Canada in respect of the Health services of Canada, Be It Resolved that we heartily approve of such a survey being made, and that the Commission be given the widest possible power: And, Furthermore, before any scheme of health insurance be enacted in any part of Canada, it would be the part of wisdom to see that such a survey has previously been made".

The Federal Government has acceded to this request and a Commission will be appointed, if it has not already been done. The Committee feels that all possible information should be obtained which has any bearing on public health and medical care in Canada before launching on any such serious program as that suggested. Nearly all information which is available at present and on which the draft Act is based is foreign. Such a survey has not been made in Canada, and the proposed Federal Commission should produce much valuable and necessary information.

Because comment is apt to appear unduly critical, the Committee has prefaced its detailed consideration of the Bill by the following general observations on important items in the Bill which have the approval of the Committee.

The inclusion of indigents with their dependents recognizes a sound principle of adequate medical care for all, and avoids the undesirable feature of a separate organization to provide medical care for the indigent.

The inclusion of the dependents of the insured is most desirable. It is obvious that the problems arising out of the need for medical care are family rather than individual.

The scope of the medical benefits is approved, aiming as it does at making adequate provision for all the medical needs of the insured.

The rights to practise and freedom of choice are preserved, points considered essential by the Committee.

The Committee appreciate the statement (section 33) which requires the Commission with the assistance of the professional groups to "establish and maintain the best possible standards of medical care". Section 33 should be read in conjunction with section 37, which instructs the Commission to "arrange for the fair and just remuneration of the persons and agencies providing medical services".

The Committee commends those clauses in the Bill which place definite responsibility on the professional groups for the control of the professional aspects of the medical benefits, and appreciates the confidence shown in allowing the College of Physicians and Surgeons to approve the choice of Director of Medical Services and to nominate the medical committee.

There are certain modifications and amendments to the draft Bill under consideration which we consider advisable and it is to these changes that attention is now directed.

Preliminary

Section 3.—"Dependent". It appears desirable to make this more definite by including such qualifying phrases as "regularly living in the home". The term "mainly dependent" should be withdrawn, or defined.

"Indigent Person". The present definition is too broad. Practically it would appear that for the purposes of the Bill an indigent is either one without means of support or below a certain income level.

Part I.

Insured Persons

Section 6 (a).—Our views as to who should be insured are well expressed by Dr. Grant Fleming in the *Annals of Internal Medicine* for August, 1934, in which he says:

"The insured group should be limited to those with an income below a figure which makes it unlikely that they can individually make provision for illness . . . . Under our present social organization there is no reason why the medical profession should be treated differently from other professions when it is a question of dealing with the well-to-do who can pay their way".

The problem, then, is to find the income level at which people are able to take care of their own medical costs.

With regard to the number and percentage who would be included under the plan, the Committee, because of a lack of information, cannot make any accurate estimates. The memorandum accompanying the Bill states "without voluntary contributors or rural insured persons, therefore, the plan fully extended would have covered about 500,000 persons if it had been in effect in 1934". This is based on the inclusion of wage earners with incomes up to $200 a month. In a recent publication Dr. H. M. Cassidy stated "with the plan extended to its full limits some 90 per cent of the population will be covered". The population of British Columbia for 1934 is estimated at 734,000 (1931 census). It will be seen that the bill can be in theory a very near approach to province-wide health insurance. Practically, it is unlikely to include more than 550,000, or 75 per cent of the population. In England, a highly industrialized nation with a concentrated urban population, the percentage of insured is 38 (dependents and indigents are not included).

As to the ability of certain income groups to meet medical costs, we submit the following information.

The Retail Credit Grantors Association, the largest organization of its kind in this vicinity and fully conversant with local conditions, was asked to give their opinion, which is as follows:

MONTHLY BUDGET FOR A FAMILY OF FOUR

Income	*$150.00*	*$200.00*
Food	$ 40.00	$ 45.00
Clothing	20.00	30.00
Shelter	30.00	35.00
Operating	20.00	25.00
Recreation	10.00	20.00
Insurance	10.00	15.00
Savings	10.00	15.00
Miscellaneous	10.00	15.00

They estimate that the $150.00 a month group has available for medical expenses sufficient to meet all ordinary medical charges, but may need insurance against hospitalization. The $200.00 a month group has available sufficient to meet all medical charges, including hospitalization. A single person, without dependents, with $100.00 a month, has available $15.00 a month or $180.00 a year and can meet all charges, including hospital.

The Report of the Committee on the Cost of Medical Care, page 17, gives the following costs of medical care, including hospital for families of different income groups.

Income Group $1,200 to $2,000

In 68.9 per cent of families medical care costs under $60 a year.
In 12.9 per cent of families medical care costs from $60 to $100 a year.

In 81.8 per cent of families medical care costs $100 or less a year.
In 13.0 per cent of families medical care costs $100 to $250 a year.

Income Group $2,000 to $3,000

In 54.4 per cent of families medical care costs under $60 a year.
In 16.2 per cent of families medical care costs $60 to $100 a year.

In 70.6 per cent of families medical care costs $100 or less a year.
In 20.6 per cent of families medical care costs $100 to $250 a year.

These figures indicate that a majority of families with $1,800 a year are able to meet medical charges in any one year; that for a considerable percentage they could be met with some difficulty, and perhaps 10 per cent would not be able to do so. Publication No. 1 of the Committee on the Cost of Medical Care states: "When it is considered that the total annual expense for maintaining a family of four, at the end of 1925, on a mere 'decency, health and reasonable comfort' budget was approximately $1,550.00, it will be seen that many families cannot afford to pay physician and hospital bills when serious illness is encountered." This statement indicates the ability of this group to take care of ordinary medical costs. It seems perfectly clear from the above figures that the person earning $200 a month, with or without dependents, needs no assistance. It is also estimated that those earning $150 a month are able, with thrift, to take care of themselves and dependents, but that insurance against hospitalization is desirable.

The plan is admittedly built on the principle that the high income groups must be included in order to finance it without any additional expense to the Government. Part of the burden of illness is being shifted from the shoulders of those responsible to a group who are in no way responsible. Such a procedure can only be justified when the burden is spread as widely as possible. The unfairness in the Bill lies in the fact that the burden is shifted to a very limited group, namely, the high wage earner and those rendering service. The doctor suffers particularly in having a group of his best paying patients removed from his private practice. It is a fact that the group earning $200 a month are among the best paying people there are. There can be no justification for putting the burden of insurance on these selected groups. The burden should be distributed throughou'

the entire population, that is, the cost which cannot be met by those needing insurance should be borne by the State.

Part 1, Section 6 (*b*).—The question of the admission of voluntary participants is one which hardly concerns the medical profession. It is one of expediency and the arguments for and against are well set out in the Report of the Royal Commission 1932, paragraphs 93, 94, 95 and 96.

Section 6 (*d*).—Under this clause no provision is made for the care of indigents till they have been in the province for two years. We can quite see that the scheme must be safeguarded against an influx of indigents from outside the province, but at the same time they must be looked after during their first two years in the province. It seems that this question is inadequately dealt with in the Bill and that the indigent will have to be taken care of in some other way than at the expense of the medical profession.

Part 1, Section 9 (*1*).—Under this clause there is apparently no income level fixed. All residents in a municipality may become insured, irrespective of income. The Committee is of the opinion that in the rural municipalities named there is a percentage of the population who have sufficient income to provide their own medical care. The same income level should apply in all parts of the province.

Part II.

CONTRIBUTIONS AND ASSESSMENTS

Section 17.—This clause, fixing the upper limit of the amount the Government may be called on to pay, opens up a very important question. The scheme is not offered as a Government subsidized one, but as one which must carry itself. There is admittedly a burden to be carried—the question is, who is to carry it?

The Government has taken good care to so safeguard itself that it cannot be involved in any additional expense over what it is spending today or which may be incurred through any unforeseen circumstances in the working of the scheme. The amount which the Government is obligated to pay for the care of the indigent and half the administration costs is estimated at $960,000, actually less than the amount it will save by elimination of hospital grants, aid to resident doctors and relief medical service (see page 18, paragraph 4). To guard against any unforeseen contingency which might involve greater expenditure, it is definitely laid down that benefits may be reduced to the insured if necessary (page 17, paragraph 4), and that additional cost must be met by a *pro rata* reduction of payments to those rendering medical service (page 37, section 38).

On page 17, paragraph 3, it is asked "What if these calculations are wrong? Will the province not find it necessary to loan or grant money to a broken-down scheme?" And the answer is "By no means". The broken-down scheme is to be preserved by benefits being reduced to the insured, by those rendering service treating more indigents at half price, and their remuneration being reduced to the minimum or below for others. If the scheme becomes unsound or insolvent it is true that it can be rehabilitated by reducing benefits, but levies could not be reduced also or there would be no improvement. Thus the insured has no guarantee that he will receive certain benefits for his money, nor those rendering service that they will receive certain remuneration. Moreover, suppose that the scheme has been functioning on full medical benefits for some time, and for some reason the benefits must be reduced to a partial service, the insured may still be paying as much into the scheme, but, for services not included, he must now pay privately. There surely can be no justification for those rendering service being involved in the uncertainties of the scheme or being forced to assume the maintenance of its financial burden. The Government is undertaking, as the custodian of public health, to buy certain medical services and dispense them to the public. The remuneration of those rendering service should not be hypothecated, as it is in the draft bill, for the financial soundness of the scheme, which admittedly may be threatened under certain adverse circumstances. The financial soundness of the scheme must rest on the State as the responsible party. Since the Government is initiating the scheme, it must take the responsibility for errors in estimates and unforeseen circumstances.

This limitation of responsibility is again seen on page 33, section 21, in which it is stated that medical benefits will be provided two months after contributions become payable. In this way it is proposed to build up the necessary reserve. Practically, what will happen is that during the two-month period in which the insured is paying for medical care and getting none, if sickness develops he will simply refuse to pay the doctor and will think himself justified. In other words, the reserve will come out of the doctors' pockets. The Government, again, should assume its just responsibility and advance sufficient money to establish a reserve as has been done in Alberta.

While, as will be seen, those rendering service must bear the brunt of any misfortune, they are apparently not to share in the good fortune. On page 19 it is stated "With financial assistance from the Dominion (which is expected) of course the financial burden upon insured persons, upon employers and upon the

province, could be reduced''. Nothing about any increased payment to those giving service.

Part III.

BENEFITS

Section 20 (*c*).—The provision made here for hospital care will be found inadequate in many cases.

Section 20 (d) Services of Specialist requisitioned by general practitioner.—It is felt that this section cannot be accepted as it stands without any qualification. As a general principle it would seem wise that the public should be advised by the general practitioner as to the need of specialist care. There is probably a growing tendency on the part of the public to decide this for themselves, very often unwisely and at unnecessary expense. It can hardly be denied that special consultations, special treatments, and special diagnostic procedures should originate with and be coordinated by the general practitioner. The present trend away from this procedure is not to the benefit of the public nor in the interest of sound medical practice. On the other hand, practically speaking, there are very many instances where direct contact between the patient and specialist seems justifiable. This clause depends very largely on the regulations laid down under Section 40, and the very complicated problems involved should be settled before any Bill can be accepted.

Section 21 (*1*) *and* (*2*).—This section deals with the method of building up a reserve fund and has been previously dealt with.

Section 22. Cash Benefits.—It is generally accepted principle that the inclusion of cash benefits in conjunction with medical benefits leads to a great deal of trouble in the matter of certification. The doctor is placed in a most difficult position in which he is called upon to serve two conflicting interests which involve the goodwill of his patient. The Committee is of the opinion that cash benefits should not be included in the same scheme as medical benefits, but should be taken care of under an Unemployment Act. If, however, the Government insists on this point, then we must insist on a complete separation of the two as regards certification, as is provided for under the Act in Section 25, *i.e.*, the certification of disability must be given by a medical officer of the Commission.

The Committee understands that certain benefits are to be offered to the insured group at the inception of the scheme, and it is suggested that medical benefits be divided into two groups, mandatory and permissive, the mandatory to include Section 20 (*a*), (*b*), (*c*), and (*d*), *i.e.*, the service of the general practitioner, maternity, hospital and specialist services, these being the fundamental services without which the plan could not be expected to function.

It is also suggested in connection with benefits that the insurance fund be so maintained as to keep separate the money collected for medical benefits from that collected for cash benefits, and so that the money for either benefit can not be used to meet expenditures of another benefit.

Part IV.

PROVISION OF MEDICAL SERVICES

Section 31.—Where payment under the scheme is on a per capita basis the right of the insured to change his doctor should be limited to two or three times a year or ''for cause''. In this way there would be some check on unreasonable demands on the part of the insured. Unreasonableness on the part of some patients is one of the most serious defects in this type of work and should be guarded against in every possible way.

Section 36.—It should be understood that such reports are not to be asked for as a basis of payment of cash benefits.

Section 38.—This section is exceedingly ambiguous. One would infer from it that those rendering service to the indigent would be paid at half rates. It needs to be read in conjunction with paragraph 2, page 15, to be understood. This reference to the payment for indigents at half rates has led to a great deal of confusion and misunderstanding, and it is therefore recommended that all reference to payment of indigents at half rates be eliminated and that one rate shall apply to all those included under the Act. The Committee is definitely opposed to the principle of payment at half rates for indigents.

There is, however, something that should be said regarding the care of the indigent. The medical profession has looked after the poor for so long for nothing, or very little, that the public and Governments have come to accept their services as a matter of course, and with no appreciation or knowledge of the vast amount of work that was done without reward, or hope of reward. It has been conservatively estimated that there is $1,000,000 worth of charity work done by the doctors of Vancouver annaully. We carry this burden of public health, which is not our burden, for the community, and the fact that we have done so is sometimes used against us. For example, on page 15, paragraph 2, it states that ''The payment of half rates for the care of indigents will not be unfair to persons providing medical services, for at present they are doing a great deal of totally unpaid work for indigents''. In other words, it will not be unfair to leave us with half of the unjust burden we have carried because in the past we have carried twice as much. This is a curious ex-

ample of the public attitude toward the medical profession.

The latter part of this clause has been dealt with previously under limit of responsibility by the Government.

Section 39 (a), (b), and (c).—The Committee is of the opinion that no reliable data exist to serve as a basis for allocation of money as outlined in Section 39, nor are these facts likely to be available till an Act similar in scope to the Bill has been tested in actual practice for a period of years.

Certain facts and figures which have a bearing on this question are presented. In estimating operating expenses the generally accepted figure seems to be about 40 per cent of gross, and this is the figure we have used. In considering gross incomes at the present time as compared to incomes in normal times, it is a conservative estimate to say that they are 33-1/3 under normal, on the average. There are 650 doctors in active practice in the province. This does not include those on salary or in Government positions. The Government estimates are based wrongly on 500 doctors. The population of the province is estimated at 734,000 for 1934. The number of non-agricultural wage-earners who would be affected by the Bill is accepted as 180,000, as stated in the Bill on page 14, although these figures seem to be arrived at in a very haphazard way. This group with their dependents, therefore, amounts to about 400,000, *i.e.*, 180,000 multiplied by 2.25. It would seem reasonable to expect that 20,000 more might be included under the voluntary plan, making in all 200,000, which, with dependents, amounts to 450,000. The number of indigents is estimated in the Bill at 100,000. Thus there are 184,000 persons left for private practice.

With regard to the cost of medical and surgical treatment, it is stated in the Report of the Provincial Royal Commission, page 40, that this amounts to $5.11 per capita for the province. This figure was arrived at by a very complicated computation, based on costs in Austria. This $5.11 was reduced, for reasons unknown, to $4.14 per capita for the purposes of the Act, (the $4.60 for medical services quoted on page 14 becoming $4.14 as the average when the indigent are included) and is allocated in the following proportion:

	Total	*Per capita*	*Percentage*
General Practitioners	$1,530,000	$3.06	73.9
Maternity	90,000	.18	4.3
All Specialists	450,000	.90	21.7
	$2,070,000	$4.14	99.9

Why the $5.11 was reduced to $4.14 and by what method or on what information the proportions to be allotted to the general practitioners and to the specialists were arrived at is not evident. Indeed it seems probable that these figures are largely conjectural and are not based on sufficient evidence to warrant their use.

The per capita cost of medical and surgical care in Manitoba for 1930 was $6.92 (C.M.A. Report, page 30).

The figures on the cost of 34,000 persons on relief in Winnipeg, just published, are illuminating. The service was a very inadequate one, covering only "relief from pain, protection of life and prevention of disability or death". A skeleton service, in other words, which covered only urgent work. The fees charged were ridiculously small; for example, major surgery $25.00; confinements in hospital $10.00, in the home $20.00; home call $1.50; office calls (which included minor surgery) $1.00; hospital calls (only allowed every other day) 50c. All bills were rigorously taxed and no one was allowed to make over $100 a month, and yet the cost per capita was $3.07. This was not a service anything like comparable to that proposed by our draft bill, nor would it begin to be acceptable to the insured, and it is far short of a complete medical service.

The cost of medical and surgical treatment by doctors in the United States in 1929 was $8.90 per capita, as follows: (Committee on the Cost of Medical Care, Publication No. 24).

	Per capita	*Percentage*
General Practitioner	$3.40	38
Part Specialist	1.95	22
Specialist	3.55	40
	$8.90	100

As to the correctness of the proportional allotment of funds between practitioner, maternity and specialist, it is difficult to arrive at a conclusion. One point, however, that stands out is the inadequacy of the allotment for maternity work.

The number of births in the province in 1933 (excluding Indians) was about 9,000. The number of these that would come under the Act (or 75 per cent) would be 6,750. The allotment being $100,000, the average fee for a confinement would be $14.80. With this fact in evidence one would require proof that the allotment of $450,000 to all specialists, was adequate. It is exceedingly doubtful.

Because of this difficulty of knowing what would be a proper allotment for different classes of work it is suggested that Section 39 (*a*) (*b*) and (*c*) be merged into one and thus create one allotment for the three.

The whole position of specialists, as to their remuneration and relation to the general practitioner, is a difficult problem and has yet to be clarified.

Section 40. Physicians' Services.—The working arrangements involved here and in conjunction with Section 20 (*d*) are of such fundamental importance that a solution must be arrived at before the final draft of the Bill is completed.

Section 43. Pharmaceutical Service (*a*) *and* (*b*).—As the designation of the drugs, medical, surgical and optical supplies that may be prescribed and the manner in which they shall be provided is essentially a matter which concerns the doctor, this clause should include the Medical Committee as well as the Pharmaceutical Committee.

Section 44 (*a*) *and* (*b*).—For like reasons this clause should include the Medical Committee as well as the Hospital Committee.

Part V.

ADMINISTRATION

Section 51. The Advisory Council.—It should be pointed out that as at present constituted it would be quite possible that there would be no representation of the medical profession on this Council. Two representatives are appointed to the Advisory Council from the Professional Services Council which represents five different services, any two of which services may be represented. We suggest that it should be laid down definitely that there be at least two medical representatives on the Advisory Council.

Section 54.—Relative to the service of doctors, it would seem only fair that when they are called on to give service to the Commission that involves loss of time they should be paid for that service over and above expenses, and at a definite rate.

Before stating our recommendations we wish to deal with a phase of the subject which has not been considered under the Act, namely the increased amount of work which the doctors will be called on to do. This increased amount of work will come from two sources under Health Insurance. In the first place, during these times of depression, a very large amount of medical and surgical care which is needed has not been sought because of financial reasons, and as a result there is a great amount of work to be done which only awaits the financial means. This hindrance will be removed under Health Insurance, and there will undoubtedly be a great demand to have this delayed work attended to, and it will take some time, perhaps a couple of years, to catch up with it. As in industry, a great "back log" of orders has been built up. In the second place there is a natural increased demand for care and attention on the part of the insured when no increased expense to them is involved.

The Committee on the Cost of Medical Care (see page 4 of the draft Bill) showed that every 1,000 people required 5,650 home, office and clinical calls during the year, as compared with 2,391 calls actually given. This is a 135 per cent increase. While it is not claimed that the increase in work would be as great as these figures indicate, yet they serve to show that under a system where increased service entails no extra cost to the individual a large increase in work is to be expected. If, for example, in round numbers the 2,400 calls actually given were increased 50 per cent, which seems possible, there would be 3,600 calls per 1,000 or 1,800,000 calls for the 500,000 insured. The $2,070,000 allotted for medical care would then yield $1.15 a call, and the fund would be exhausted and nothing would have been paid for maternity, surgery or specialists. No business man would enter into an agreement to furnish an amount of work for a fixed sum which was questionably adequate for that work with the possibility of being called on for 50 per cent more work without remuneration. A Government entering into any contract with such an element of uncertainty would be required to give some guarantee of meeting the additional cost. The fixing of the limit of Government responsibility removes any element of uncertainty from the Government side of the contract, but leaves a very grave uncertainty on the side of the medical profession. If the remuneration suggested by the Government approximates the average income of doctors in the past, which income was received for a certain amount of work, then that remuneration could not be considered adequate if the work were increased, say, 50 per cent.

There are two methods by which the profession may be remunerated for their services, namely, so much per capita and for services rendered. The Committee believes strongly in the principle of payment for work done, because we believe that under a system as near as possible to that which exists today there must be a greater interest taken in our work, a greater stimulus to keep abreast of the advances in medical knowledge and to maintain and advance that high standard which the practice of medicine has reached, and because we believe that under a per capita payment contract system where payment is the same, no matter what service is rendered, the science and practice of medicine will deteriorate, and finally because we believe that any system under which medicine will deteriorate will be detrimental to the public good. It is suggested that it should be possible to work out a scale of fees that would in the total approximate the amount decided on as adequate under ordinary circumstances by the Government and the medical profession. This method would leave a flexibility to the financial liability of the Government whereby they would be justly responsible for that increased amount of work which is certain to arise and which otherwise would have to be

borne by the medical profession without remuneration.

The Preamble of the Act makes capital out of the fact that the Plan will cost the Government nothing extra; indeed, it seems that it is by this assertion the Government justifies itself in bringing forward the Plan at the present time, a time when they cannot be involved in additional expense.

As stated before we are in favour of Health Insurance confined to a certain group, but we want to see it started properly and on a basis which will give satisfaction to both contracting parties, the public and the medical profession. There is not a shadow of doubt that any scheme which is not favourably received by the medical profession cannot be a success. If the financial situation is such that the scheme cannot be initiated on fair business principles, then the time is not opportune.

RECOMMENDATIONS

For reasons previously set forth the Committee recommend that:

1. The introduction of the Act be postponed, as suggested in the resolution of the Canadian Medical Association.
2. (*a*) The income level be fixed at $125 a month or $1,500 a year and under for all groups. (*b*) Compulsory insurance against hospitalization be provided for wage-earners and their dependents with incomes between $125 and $200 a month. (*c*) Voluntary insurance against hospitalization might also be provided for all others with incomes above $200 a month.
3. Payment for medical services be made on a basis of a schedule of fees to be arranged between the Government and the medical profession, except where local conditions make it advisable to have a different system, *e.g.*, capitation or salary, and that it be obligatory on the part of the Government to meet accounts rendered for service on the basis laid down in this schedule, said schedule to be operative for six months, when it may be adjusted by mutual consent of both parties.
4. Cash benefits be not included in the same scheme as medical benefits.
5. Medical benefits be divided into two groups, mandatory and permissive, the mandatory group to include Section 20 (*a*) (*b*) (*c*) and (*d*).
6. The scheme be initiated with only the mandatory benefits.
7. The insurance fund be so maintained as to keep separate money collected for medical benefits from that collected for cash benefits or other benefits, so that the money for one benefit cannot be used to meet expenditure of another benefit.
8. The funds alloted for different classes of medical work under Section 39 (*a*) (*b*) and (*c*) be merged into one fund.
9. All reference to payments for indigents at half rates be eliminated and that one rate shall apply to all those insured. This Committee does not recognize the principle that the responsibility of the Government towards the indigent is fulfilled by paying half rates for indigents. The Government should pay the same amount into the funds for the indigent as industry pays for the other insured.
10. The Government should assume the responsibility of providing sufficient money to establish a reserve fund.

W. E. AINLEY, M.D., *Chairman,*
Health Insurance Committee.

THE HEARINGS COMMITTEE OF BRITISH COLUMBIA ON HEALTH INSURANCE

Sessions of the Hearings Committee of the Provincial Government in the matter of Health Insurance, referred to in the last issue of the *Journal,* opened in Vancouver on September 9th. The representations made by various organizations as they appeared in turn were given prominence in the daily press, and have stimulated a certain amount of interest in the public mind.

The Christian Scientists were opposed to the scheme only to whatever degree it might interfere with their faith. In order to make the bill satisfactory to them it should be amended to exclude "any person who adheres to the faith or teaching of any well-recognized religion, sect, denomination or organization, who in accordance with his creed, tenets or principles, depends for healing upon prayer in the practice of religion".

The Chiropractic Association of British Columbia considered that the bill would be contrary to the best interests of the public. Their representative stated among other things that it would create a medical monopoly, and placed too much power in the hands of the medical men. He asserted that "It is unemployment insurance for some six hundred doctors".

The Vancouver, New Westminster and District Trades and Labour Council advised abridging the proposed commission from five to three members, one representing employees, another the employers, and the third the government. They further recommended ex-

tension of the scope of the scheme to include everyone over twenty-one years of age, unlimited instead of limited free ward hospital care, and the right of patients to select any licensed practitioner.

Strong opposition to a provincial scheme of Health Insurance was expressed by the representative of the British Columbia division of the Canadian Manufacturers Association and the British Columbia Lumber and Shingle Manufacturers Association. It was believed that if health insurance was necessary it must be a federal scheme to be financially sound, since industry and employees in British Columbia could not stand the additional burden thrust upon them by the levies of such a provincial scheme as is now proposed. Retail merchants felt that an equitable scheme was desirable, but urged that all persons should contribute and not only those with salaries up to $200.00 monthly.

Osteopaths based their protest against the draft bill upon the discrimination which would operate against their profession.

In closing the Vancouver hearings on September 19th, Hon. G. M. Weir, Provincial Secretary, emphasized that under the British North America Act public health measures were a function of the province, as a rebuttal to the opinions expressed that only a Federal scheme would be satisfactory. On the following day, a lengthy and unauthorized report having appeared in the papers that unanimous opposition to health insurance as proposed in the draft act had been expressed at the annual dinner of the British Columbia Medical Association, Dr. Weir issued a written statement to the press in which he hit back strongly at the presidents of the British Columbia, Canadian, and American Medical Associations who had opposed health insurance. He stated that while heads of the medical associations attacked the scheme, the Government's poll of the medical profession in British Columbia showed that 75 per cent of the doctors in the province are favourable to the program. With reference to the suggestion of the medical leaders that a Royal Commission should consider the subject further, he stated that British Columbia had had two such commissions and had "collected all conceivable data on the subject after years of consideration." He also quoted Dr. Alfred Cox, former secretary of the British Medical Association, in support of his own views of what was good for the profession in British Columbia.

The Vancouver Board of Trade appeared before the Hearings Committee in Victoria and added its weight to the demand expressed by other organizations for a Dominion-wide survey and report before further action is taken by the provincial Government.

As a contrast to the Hon. Dr. Weir's statement of a year ago that 90 per cent, and more recently (see above) 75 per cent, of the medical profession had expressed themselves as being in favour of his health insurance scheme, the press reported that at the hearing of the representative of the College of Physicians and Surgeons of British Columbia it was shown that 100 per cent of the medical men of the province were "unanimously and unalterably opposed" to the Government's draft Health Insurance Bill. Emphasis was laid upon the fact that the legal counsel of the College who presented the brief was a supporter of the Government in the Provincial Legislature and that the committee which had prepared it included more than one Liberal member of the House. The brief stated that 75 per cent of the medical men supported the principal of Health Insurance but that the draft bill was unworkable and unfair.

In reply to their objections the Hon. Dr. Weir, Minister of Health, and Hon. George S. Pearson, Minister of Labour, said that the province already had adequate data on the subject and further enquiry was unnecessary. Speaking further, Mr. Pearson denied that doctors gave generous services to the poor for nothing. Actually he said, the public paid the cost, because doctors charged "three times what the services are worth" and had to do so in order to cover their unpaid work. The hospitals operated on the same basis, he claimed, and the doctors generally and hospitals would benefit by the scheme, only a few doctors who charged almost more than the public could pay suffering any reduction in income.

ASTHMA AND DISEASES OF THE NOSE.—S. Brorson has examined the noses of 435 asthmatics, 353 of whom were over the age of 15. Grouped under ten-year age periods the asthmatics were most numerous between the ages of 10 and 20 and 30 and 40. In 292 cases, or 67 per cent of the total, some disease or other of the nose was found. The patients were men in 38 per cent (110), women in 43 per cent (126), and children in 19 per cent (56). The sex and age distribution was the same for the patients with and without diseases of the nose—an observation suggesting that sex and age played no part of importance in the genesis of this complication of asthma. In the absence of convincing evidence of improvement in the asthma from treatment of the nasal disease, the author is disinclined to link up the one with the other etiologically or therapeutically, and he suggests that the wisest course is to treat nasal ailments on their own merits.—*Ugeskrift for Laeger*, February 28, 1935, p. 275. Abs. in *Brit. M. J.*

Men and Books

THE LITERARY ILLUSTRATIONS OF ARETAEUS OF CAPPADOCIA

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Aretaeus of Cappadocia, a medical writer of the second century A.D. and a contemporary of Galen, whose extant works[1] are of some significance in the history of medical literature, illustrates his theories by quotations from just three earlier authors, Hippocrates, Thucydides, and Homer. His references, apart from those to Hippocrates, are few enough to be cited in their entirety, and it is of interest to observe how apposite has been his selection of illustrative literary passages.[2]

Approximately one-half of the references which can be traced to Hippocrates owe their origin to the Aphorisms; an appreciable proportion of the remainder are evidently chosen for their epigrammatic style. Aretaeus quotes apparently for literary more than for scientific effect, sometimes repeating the Hippocratean aphorism as such, sometimes modifying it only slightly to suit the syntax of his own composition, or again but vaguely echoing a theme that has been covered by Hippocrates. "Spasm from a wound is fatal," says Aretaeus, referring to an aphorism of Hippocrates to illustrate his discussion of tetanus. Aretaeus commences his treatment of cardiac affections by urging the physician to practise foreknowledge, for if he foresees the approach of the disease, and "if things present co-operate" he may be able to cope with it in advance. This advice amounts to an abbreviated statement of the first aphorism of Hippocrates, where the physician is told that in addition to performing his duty he must be able to secure the cooperation of the patient, the attendants who are present, and of things external. Change of diet, recommended as a cure for epilepsy, brings to mind the more extensive treatment advocated by Hippocrates for epilepsy in the young. The name "dorsal pleurisy", which Aretaeus credits vaguely to his predecessors, appears to belong to Hippocrates, while the characterization of the liver as "the roots of the veins", which occurs twice in Aretaeus, is found in similar phraseology in Hippocrates. The fatal significance of jaundice appearing before the seventh day in pneumonia recalls two aphorisms of Hippocrates, while the sentence which summarizes the sequelæ of scotoma suggests that Aretaeus may have had in mind a whole series of Hippocratean aphorisms. In explaining what is meant by saying that "the leg on the same side was apoplectic" Hippocrates is mentioned by name, and he is quoted almost verbatim in the epigrammatic statement of the impossibility of getting rid of a violent attack of apoplexy and the difficulty of dealing with a slight one.

There are also descriptive passages in Aretaeus of a general nature, from which one might argue with reason that he was acquainted with a similar treatment by Hippocrates, though no more precise identification of the parallel passages would be warranted. The treatment of epilepsy is a case in point, while the description of the athetosis of phrenitics, who pluck at the bed-clothes and see false visions before their eyes, suggests at once a similar passage from Hippocrates.

Too much subjective reasoning enters into this type of comparison to allow one to compile with any confidence a complete list of borrowings from Hippocrates. It will be seen, however, that while Aretaeus was very familiar with the Hippocratic Corpus the uses which he makes of it are neither frequent enough nor precise enough to be of great importance in an evaluation of his own scientific theories. He is usually seeking only an apt phrase or a well known epigram to make more vivid his own account.

Thucydides he had probably read in part at least, for although he does not mention his name he refers to the suspicion of the poisoning of the wells in the Piræus, which Thucydides (II, 48, 2) includes in his description of the plague at Athens. Aretaeus, still befogged by the philosophy of his predecessors, the Pneumatists and Eclectics, enters on a confused explanation of the Thucydidean reference, which is of interest chiefly just because so few later writers have taken any account whatever from a scientific point of view of Thucydides' careful description of the plague.

The remaining classical references of Aretaeus are all taken from Homer,[3] and, curiously, all

1. The works are: Causes and Symptoms of Acute Diseases; Causes and Symptoms of Chronic Diseases; Treatment of Acute Diseases; and Treatment of Chronic Diseases.

2. There is some reason to believe that Aretaeus relied to a large extent on the writings of Archigenes in preparing his own work.

3. For some comments on the trustworthiness of Homeric medical and surgical descriptions *cf.* Thomas Day Seymour, Life in the Homeric Age: New York, Macmillan (1907), 619 f.; Sir Clifford Allbutt, *Class. Rev.*, XXXVII, 1923, pp. 129-31; E. T. Withington, Hippocrates. Loeb Class. Lib., vol. III, New York, Putnam (1927), Introd. xi-xii.

from the Iliad. The first reference occurs in the description of the seizure of epileptics. Aretaeus describes an epileptic seizure with an attention to detail and accuracy that bears comparison with the scientific treatment of medical writers from Hippocrates to Sir William Osler.[4] Then, however, he reverts to the less scientific doctrine of the *pneuma*, which he inherited from his predecessors, and concludes, without much scientific meaning, that if the spirit is mixed with the humours it resembles a relief from the former suffocation, and the patients spit out foam "as amid the mighty waves the sea spits forth the froth". He has borrowed his figure from the simile of the marching Danaans in Homer, who move in close array like the wave that breaks upon the land "and spews out the froth of the sea (*Il.* IV, 422-26)". The quotation is not literal, nor is there any apparent significance in its choice beyond the vivid comparison. Aretaeus has simply turned to poetry when he has abandoned science.

The second quotation, if it be accepted, is also taken from a description of the wind at sea. Identifying the disease scotoma or scotomata, he cites a number of symptoms to be observed,—darkness of the eyes, a whirling of the head in dizziness, a ringing of the ears as from the tumultuous rolling of rivers or "as from the wind when it roars among the sails", the sound of pipes or reeds, or the rattle of a carriage. While there is some difficulty about the textual reading, the words "as from the wind when it roars among the sails" is probably to be identified as a borrowing from that passage in the Iliad in which Hector is described falling upon the Danaans, as when the wind driven by the storm falls on the swift ship, and it is hidden beneath the foam, "and the fierce wind roars against the sail (*Il.* XV, 626-27)". The situation in the Iliad has no significance for Aretaeus. The borrowing is simply for poetic effect, although the comparison is most apt, and this time he is not concealing faulty science behind poetic diction.

In treating of melancholy Aretaeus calls on Homer for confirmation of his description and derivation. Certain people suffering from the disease exhibit only anger and grief and a woeful dejection, without positive physical findings. Allowing for variations in diction, Aretaeus has said of the disease practically the same thing as Professor Stevens:[5] "Melancholia is a pure mental disease, the essential feature of which is a profound, causeless depression". Such persons, continues Aretaeus, are called *melancholics*, because *anger* (ὀργή) is synonymous with *bile* (χολή), and the idea of *much* (πολλή) and *fierce* (θηρώδης) are synonymous with *black* (μέλαινα). In proof of this connection he cites four verses from the Iliad (1, 101-104) in which Agamemnon is described as rising up in sore *anger*, and his *black* heart is *much* filled with *wrath*, and his eyes flash like fire. The association of the condition of melancholy is well known from other sources, and it has scarcely seemed necessary to repeat the Greek verses to indicate the proof that Aretaeus is seeking. The passage from Homer is perhaps as good a source as he could have found to illustrate his point.

It is in the description of the disease "elephas" or "elephantiasis", a terrible malady which seems to have powerfully affected the imagination of Aretaeus, that he turns most freely to poetic comparison.[6] There are many points of similarity between the beast and the disease, says Aretaeus, but neither is the elephant like any other beast nor is the disease like any other affection. In colour elephants are black all over the body, whereas one horse may be very white "like the Thracian horses of Rhesus". He has taken this comparison from the report of Dolon to Odysseus of the horses of Rhesus, the most beautiful horses that he has ever seen and the mightiest, "whiter than snow (*Il.* X, 436-437)". Other horses may be white-footed "like the white-footed horse of Menelaos". He is referring to the scene in the funeral games of Patroclus where Menelaos yokes a swift pair of horses, "Agamemnon's mare Aethe and his own horse Podargos (White-foot) (*Il.* XXIII, 295; cf. *Il.* VIII, 185)". Still others may be bay "like the one hundred and fifty", a reference to the boasting reminiscence of Nestor, who in his youth during a quarrel with the people of Elis drove off much plunder and among the animals "one hundred and fifty bay mares, many with their foals beside them. (*Il.* XI, 680-681)". Others may be dark (Κυάνεοι), as was Boreas when he "likened himself to a horse with a dark mane". The reference is to the meeting of Aeneas and Achilles when Aeneas recites the lineage of his race, and, in passing, how Boreas consorted with the three thousand mares of Erichthonius, "likening himself to a dark-maned horse (*Il.* XX, 224)".

Having distinguished by Homeric reference the varying colours of horses, Aretaeus observes that the same is true of oxen, dogs, and all other creeping and living things that dwell

4. Sir William Osler, Principles and Practice of Medicine: London and New York, Appleton, 1925, p. 1108.

5. *Cf.* A. A. Stevens, *Practice of Medicine*: Philadelphia and London, Saunders, 1922, p. 1035; *cf.* also p. 556 for cerebral symptoms of jaundice.

6. For a long and detailed study, including both physical and psychological factors, of a man afflicted with the disease, *cf.* Sir Frederick Treves, The Elephant Man: London, Cassell, 1923. Sir Frederick had published earlier studies of this case in the *British Medical Journal* of 1886 and 1890.

upon the earth, but elephants alone are of a dark colour (ζοφωδέες), "like to Night and Death". This latter phrase does not occur in Homer, but it is obviously a quotation, and it is probable that Aretaeus meant to refer not to "Night and Death", but to "Sleep and Death",[7] the swift envoys who are entrusted by Apollo to bear the fallen Sarpedon to the land of Lycia (*Il.* XVI, 672, 682).

In connection with the treatment of cardiac diseases Aretaeus urges the adoption of measures to restrain perspiration. In addition to therapy through various applications the patient should be made to lie in a cool breeze in a house opening toward the north, "and if the cool breeze of Boreas should blow on him it will refresh him as he gasps painfully for breath". The refreshing breeze of Boreas is copied closely from the scene of the wounding of Sarpedon, who was struck on the thigh by the long spear of Tlepolemos. Sarpedon was removed from the battle, and when his comrade Pelagon drew the spear from his thigh his spirit left him and mist covered his eyes. Shortly, however, he drew breath again, "and the breeze of Boreas played about him and refreshed him as he gasped painfully for breath (*Il.* V. 697-698)". Aretaeus had doubtless observed that exposure to a breeze before an open window together with a restricted fluid intake, which is part of the modern routine treatment for those suffering from functional deficiency of the heart, improved the condition of cardiac patients, but, as he failed to realize, the resulting control of perspiration would be purely an incidental effect of this treatment, either in antiquity or at present.[8]

When Aretaeus refers to Sarpedon as an example of cardiac disease he can, however, scarcely be correct. In the first place, had Sarpedon been suffering from any severe organic heart lesion he would not have been actively engaged in battle a few minutes before he was wounded. When Pelagon drew the spear from his thigh and he reacted after the manner of a cardiac patient, one of two things probably happened. Either he simply fainted from pain, and revived when the spear was removed and the breeze played on his face, or he fainted from loss of blood due to a sudden and considerable hæmorrhage.[9] Perhaps the latter is the more probable, for Homer describes him as gasping for breath, a phrase that sufficiently characterizes a condition known technically as "air-hunger", which is manifested by patients who have lost a considerable quantity of blood, especially if they have lost it rather quickly. Such patients are not suffering from any failure of cardiac function but from a deficiency of hæmoglobin in the blood, which can no longer carry sufficient oxygen to the brain centres. Fainting is due to a temporary cerebral anæmia, and the earliest manifestation of a lack of oxygen will appear on the brain cells rather than on the heart muscles. The heart itself is not affected either in fainting or in hæmorrhage.[10] This explanation of the condition of Sarpedon will accord readily enough with the description of Homer, who seems to have been quite aware of the true condition of the hero. But Aretaeus has been unfortunate in his choice of an Homeric quotation to illustrate an acute cardiac condition.

There remains one further Homeric quotation, this time selected to corroborate a statement of surgical condition. Acute affections of the bladder, says Aretaeus, citing them specifically, resemble those of the kidneys except that the pain is more intense and death is very swift to follow. In proof of the acute suffering of persons who are so afflicted Aretaeus quotes from Homer, in reference to a wound of the bladder, the observation: "there Ares proves himself most baneful to wretched mortals" (*Il.* XIII, 568-569). The Homeric quotation refers to a type of wound which is described three times in the Iliad. The victims are Adamas (*Il.* XIII, 560-575), Harpalion (*Il.* XIII, 644-655), and Phereclus (*Il.* V, 59-68), but in each case the aggressor is Meriones. While details of the wounding differ the situation is largely the same in each case. All three heroes are retreating to their own ranks when Meriones wounds them from the rear, twice with a spear and once with an arrow. In the first wound, that of Adamas, the spear did not pass completely through the body, and while

7. *Cf.* in this connection the study by Marbury B. Ogle, "The Sleep of Death", Memoirs of the American Academy in Rome, XI, American Academy in Rome (1933), 81-117. Professor Ogle points out that this metaphor, which occurs in Homer, is comparatively rare in the intervening literature up to the Alexandrian Period.

8. Patients in the cardiac ward of a modern hospital are put to bed on a restricted fluid diet, and propped up before an open window, so that they may be refreshed by the cool breezes for which, as Aretaeus observed, they gasp painfully. This treatment is followed not, as Aretaeus evidently thought, to restrict perspiration, although it would have that effect, but in order that the heart, struggling already with functional deficiency, may be better able to cope with circulation when the quantity of fluid in the body has been reduced. The swelling of feet and ankles is brought under greater control, the collection of moisture at the base of the lungs is kept at a minimum, and the danger of death from hypostatic pneumonia is lessened.

9. For a modern surgical description of the dimness of vision, black specks floating before the eyes, the roaring sound in the ears, the yawning and restlessness of a patient who is suffering from a severe, profuse, and rapid hæmorrhage, *cf.* J. C. da Costa, *Modern Surgery*: Philadelphia and London, Saunders, 1931, p. 349.

10. The gasping breath, the desire to be fanned or propped before an open window, commonly expressed by persons exhibiting "air-hunger" from hæmorrhage is, of course, a picture very similar to that of a patient suffering from failing function of the heart, and the reason, as explained above, is somewhat similar.

Aretaeus assumes that it struck the bladder and for that reason caused death, Homer does not specifically say so. In fact, though Adamas collapsed at once in agony on being wounded, he did not die until Meriones approached and drew the spear from his body. In the wounding of Harpalion and Phereclus the arrow and spear respectively struck the right buttock, passed through the bladder, and emerged beneath the symphysis pubis. Death followed swiftly for both, and in the case of Harpalion it is added that the black blood ran out and wet the ground. The surgical picture is practically the same for all three wounds.[11] The weapon would produce an extensive intraperitoneal laceration of the bladder, the peritoneal cavity would become filled with blood and urine, and if infective peritonitis developed the wounded warrior would eventually die. On the other hand the fluid would at first begin to drain to the surface, the man would have an infected wound, but he would also have a reasonable chance of recovery. From such a wound of the bladder in and of itself a man certainly would not die for several days at least, until peritonitis or cellulitis supervened. A somewhat similar wound coming within the recent clinical experience of one writer of this paper involved a carpenter who, falling from a veranda roof, fractured his pelvic bones and drove a spicule of bone through the bladder, causing substantially the same condition in the peritoneal cavity as that which must have resulted with the Homeric heroes, so far as that particular wound is concerned. It was not possible to start treatment in this case until three hours after the accident occurred, but the man was never in acute danger and he subsequently recovered.

If then the wound inflicted by Meriones was not of itself sufficient to cause immediate death, what is the explanation of the swift death of Harpalion and Phereclus, and the slightly delayed death of Adamas? The clue is probably to be found in the statement regarding Harpalion, that the blood ran out freely and wet the ground. The spear, following the path that has been described, would probably injure whatever part of the intestine happened to be lying in the pelvis at the time, and it would almost inevitably sever one or more of the major arteries. Otherwise we should have to suppose that it miraculously missed the right common iliac, the right external and internal iliac, the right ilio-lumbar, the right lateral sacral, the superior and inferior gluteal, the internal pudendal, the superior, middle, and inferior hemorrhoidal, the superior and inferior vesical, and the obturator arteries, not to mention the large veins corresponding to each artery. Therefore we may conclude that Harpalion died not because of a bladder wound, but because he bled to death.[12] Phereclus, whose wound is described in similar language, though without the detail of the flow of blood, doubtless died for the same reason, and Adamas, who writhed on the ground about the spear like a bull that is bound with withes and dragged by the herdsmen on the hills until Meriones pulled it from his body, probably suffered a severed artery, but continued to live as long as the blood was staunched by the spear.

Homer apparently was perfectly sound on his surgery and his anatomy. Aretaeus on the other hand seems not only to have misunderstood Homer, but to have exaggerated the seriousness of the affection itself. He would in any case have found a more appropriate illustration of his point if he had chosen to quote from Homer either of the other two passages.

This concludes the classical quotations of Aretaeus. Two of them, that in which he argues the derivation of the Greek word for melancholy, and the one which has just been under discussion, are taken as such from Homer and are accurately quoted. In the remaining instances Aretaeus is not at pains to keep the precise form of the Homeric verse, and he readily adapts the syntax to his prose story. With the exception of a single reference that presupposes a knowledge of Thucydides and of scientific cross-references to Hippocrates, Homer is the only author whom he quotes. That he should have confined his Homeric quotations exclusively to the Iliad is somewhat peculiar, but is probably due only to a personal preference for and a consequently greater familiarity with that poem.

It must be confessed that when Aretaeus quotes from the classics his imagination is likely to run wild and his reputation is not enhanced. Perhaps in his reading of the Hippocratic corpus he had failed to mark the passage in the Precepts in which the writer urges the physician, if he must deliver a public address, at least to eschew all quotations from the poets, since to cite them is an indication of indifferent industry. An examination of the classical references does, however, demonstrate the acquaintance with and use of Homer and Hippocrates by an important but comparatively little read medical writer of the second century of our era.[13]

11. In Homeric warfare the shield would ordinarily protect a man from receiving a wound of this nature from the front, and conversely the wound from the rear is uncommon in present day surgery because in the organization of modern society there are few circumstances which are likely to cause a man to be pierced by a spear or any other implement from the rear through the lower abdomen.

12. The fact that Homer speaks of "black blood" in connection with the wound of Harpalion is probably not sufficient evidence on which to identify it as venous blood, since "black" is a stock epithet for blood in Homer.

13. Most of the references and critical notes have been omitted from this article. Anyone who is interested may secure a list of them by applying to either of the writers of the paper.

Association Notes

The Meeting at Atlantic City

SECTION ON OBSTETRICS, GYNÆCOLOGY, AND ABDOMINAL SURGERY

This Section convened on June 12th, under the joint presidency of Dr. James R. McCord, Atlanta, Ga, and Dr. John R. Fraser, Montreal.

Dr. McCord's address as chairman was entitled "Syphilis and Pregnancy; a Clinical Study of 2,150 Cases."

The study included 2,150 cases of negro women, in all of whom blood tests showed evidence of syphilis during the prenatal period. The results show indisputably the ravages of the disease and the wonderful effects of efficient treatment.

Of the entire group, 1,454 visited the prenatal clinic of Emory University School of Medicine one or more times; the remainder did not visit the clinic at all. Dr. McCord presented figures to show that successful childbirth followed closely the amount of treatment the mothers received; 49.4 per cent of the women who received no treatment lost their babies, whereas only 5.4 per cent of those who received ten or more treatments lost the children. Women who had not been treated gave birth to more than half the premature babies, and those who had good treatment, only 7.1 per cent of them. Many infants were born dead, and it was estimated that probably one-half of those born alive died in a few weeks.

The results were analyzed in various other ways that showed the same encouraging results. For instance, organisms of the disease were found in 120 of the 197 babies who died, and comparison showed that 89 per cent of these were born to mothers who had received no treatment, and the mothers of 10 per cent had received fewer than six treatments.

The fact that only 3 deaths occurred in this series of 2,150 women seems to refute the general opinion that syphilis is the cause of high maternal mortality among negro women. These deaths were due to other infections.

"There seems to be no condition in medicine that returns such huge dividends in life and health, with such a small output of energy and money, as that seen in the prevention of congenital syphilis," Dr. McCord concluded.

DR. FRASER'S subject was "Maternal Mortality and Morbidity".

A New Biological Test for Hormones in the Urine, as Applied to Various Clinical Problems—DRS. A. E. KANTER, C. P. BAUER, AND A. H. KLAWANS, Chicago.

These authors, amplifying a previous report, emphasized that they did not bring forward this new test to replace those already in use.

The Japanese bitterling, a tropical fish of the carp family, has a visible ovipositor which under stimulation by the œstrogenic hormone becomes greatly elongated. This reaction has been used as a test for pregnancy and allied conditions and as an indicator of the potency of various commercial hormone products. The test has also been applied to the study of certain clinical conditions in which an excess of the œstrogenic hormone is a possible etiological factor or is present as an accompaniment to the existing abnormality.

Since theirs is a different hormone from that used in the Friedman and Ascheim-Zondek tests, their test gives positive results later than the other two. Therefore, the Friedman and Ascheim-Zondek tests are of more value in the diagnosis of early pregnancy. In the later stages all three tests may give the same results. When something goes wrong the hormone used in the former tests disappears, while the Kanter test remains positive. The Kanter test is recommended as an aid to diagnosis in complicated cases.

The Effect of Progestin and Œstrogenic Substance on Human Uterine Contractions, and the Value of Progestin in the Prevention of Habitual and Spontaneous Abortions—DRS. F. H. FALLS, J. E. LACKNER, AND L. KROHN, Chicago.

A rubber bag was introduced in the uterus of women seven days after delivery and connected with a kymograph Tracings showed that progestin (the luteal hormone) almost completely inhibited the action of 1 c.c. doses of posterior pituitary extract, irrespective of the sequence of administration. Œstrogenic substance stimulated uterine contractions when given alone, and sensitized the uterus to subsequent doses of posterior pituitary extract. Patients with habitual or threatened spontaneous abortion were prevented from aborting by injections of progestin. In habitual abortion, one rabbit unit of progestin was injected twice weekly until the thirty-second week. In threatened abortions while bleeding, two ampoules of progestin a day were used until the cramps and bleeding stopped. These patients were then treated as in habitual abortion cases. This therapy proves practically specific, provided the membranes are not ruptured and the fetus is alive.

Certain Menstrual Disturbances Associated with Low Basal Metabolic Rates—DRS. S. F. HAINES AND R. D. MUSSEY, Rochester, Minn.

In a previous paper these authors had reported on treatment, by oral administration of thyroid, in a group of patients with amenorrhœa or oligomenorrhœa and low basal metabolic rates without evidence of myxœdema. This paper dealt with further observations in a larger group of similar patients and included also a small group of patients with menorrhagia, all of whom were treated by elevation of the basal metabolic rate. The dosage of thyroid was standardized for each individual patient. Patients who received other significant treatment were not included in this report. Partial improvement or relief of the menstrual disturbance was noted in approximately 70 per cent of a series of 74 patients.

The Clinical Investigation of Endocrine Sterility—DRS. P. B. BLAND, A. FUST, AND L. GOLDSTEIN, Philadelphia.

This paper was chiefly concerned with the problem of sterility in cases where all extrinsic (organic) causative factors have been eliminated, and dealt with the investigation of sterility resulting from unbalance of the various endocrine glands. The laboratory aids employed in the diagnosis were emphasized and the treatment and results indicated.

Sterility: Analysis of Causes and Treatment—DR. P. TITUS, Pittsburgh.

Human sterility, with its subdivisions primary and secondary sterility and absolute and relative sterility, were briefly defined, with a plea for the universal adoption of Meaker's classification. Essential details were outlined for the study and treatment of cases of relative sterility. The fact was emphasized that successful treatment depends on routine complete analysis of each case, with final compilation in review of all faulty factors found. Treatment is highly successful if this is done and comparatively unsatisfactory if the studies are incomplete. Pregnancy follows appropriate treatment in a notable percentage of instances of relative sterility. Surgical treatment for absolute sterility in the female and in the male is also available and was briefly outlined. A series of 113 cases was reported.

The Toxæmia of Pregnancy: A Clinical Study—DR. J. R. GOODALL, Montreal.

This study was the result of minute investigations of more than 300 cases. It comprised accurate individual clinical, physical and chemical observations, and general deductions. There is only one toxæmia of the second and third trimesters. Cases fall easily into two great categories: acute and chronic. Cases of the first category conform to four clinical types: vasculorenal, hepatic, hæmorrhagic, and cerebral or neurotropic. These groups take their chief clinical characterizations from the system which bears the brunt of the attack and which shows the first signs of decompensation. Chronic cases conform somewhat to the same clinical types, though numerically the vasculorenal group greatly outnumbers all the others. This study also took into consideration susceptibility as to age, constitution and other personal attributes. The origin was discussed. The treatment is now no longer empirical but rational.

The Clinical Significance of Weight Changes in Pregnancy—DR. H. B. VAN WYCK, Toronto.

Various factors underlying changes in weight were considered and a series of cases reviewed in which the relationship of the changes in weight to the toxæmias of pregnancy were noted. The bearing of these on the starvation factor of hyperemesis and of fluid retention in the later toxæmias was discussed.

The Mechanism of Rotation in Occipito-posterior Positions—DR. J. MANN, Toronto. This paper will appear in the December issue of the *Journal*.

The Intravenous Use of Hypertonic Dextrose in Obstetrics and Gynæcology—DRS. H. B. MATTHEWS AND V. P. MAZZOLA, Brooklyn, N.Y.

During experimental shock in cats hypertonic dextrose solutions, given intravenously, raise the blood and pulse pressures and lower the pulse rate. In patients with hypotension and myocardial insufficiency the administration before operation of a 50 per cent dextrose solution intravenously diminishes the risks from anæsthesia and operation. Generally, the same procedure protects from shock those who are to be subjected to prolonged anæsthesia or operation. When introduced after operation hypertonic (50 per cent) dextrose raises blood and pulse pressure, increases cardiac tone, and facilitates the absorption of subcutaneous saline solutions. After a sudden loss of blood 50 per cent dextrose, given intravenously, elevates the blood pressure and carries the patient along until transfusion can be done. Intravenous hypertonic dextrose solution with subcutaneous saline solution diminishes post-partum, post-abortal, and post-operative acidosis and vomiting, and it is useful in early peritonitis.

Hæmaturia as a Complication of Pregnancy—DR. H. L. MORRIS, Detroit.

A survey of the literature to date reveals only a few case reports of hæmaturia as a complication of pregnancy. In a series of 154 unselected pregnant women seeking urological advice approximately 20 per cent had as a complication gross or microscopic blood in their urine. Further study of these patients disclosed as the origin of the bleeding serious lesions of the genito-urinary tract, among these being pyelitis, hydronephrosis, ptosis, megalo-ureter, and ureteral calculus. In every case there was demonstrable evidence of the origin of the hæmaturia, and there was no instance of the so-called "essential" or "idiopathic" hæmaturia.

On the morning of June 14th the Section conducted a Symposium on Obstetric Anæsthesia and the following papers were read:—

Parasacral, Pudendal and Local Infiltration Anæsthesia in Obstetrics—DRS. B. E. TUCKER and H. B. W. BENARON, Chicago.

The authors' experience with parasacral, pudendal and local infiltration anæsthesia in obstetrics was presented. Parasacral anæsthesia is successful for difficult major operative deliveries from below. The technique is simple and safe. Temporary cessation of uterine contractions occurs. Traction pain is abolished. There is marked relaxation of the pelvic floor musculature and, in about 50 per cent of cases, skin anæsthesia of the perineum. Pudendal block anæsthesia is satisfactory for spontaneous delivery and easy outlet forceps. The bearing-down reflex is abolished and relaxation of the pelvic floor occurs with, in most instances, skin anæsthesia of the perineum. The labour pains are not affected. Infiltration is successful for the primary repair of lacerations and episiotomy wounds and also serves to complement the incomplete regional block. For abdominal Cæsarean section it is the anæsthesia of choice and, when combined with pudendal and parametrial block, is applicable to vaginal Cæsarean section.

Spinal Anæsthesia, with Particular Reference to its Use in Obstetrics—DRS. S. A. COSGROVE, P. O. HALL and W. J. GLEESON, Jersey City, N.J.

Spinal anæsthesia has been much criticized because of the lack of standardization of technique and the failure to apply physiological and surgical principles. The personal experience of one of the authors in general surgery was utilized to determine the dangers, contra-indications, advantages and special indications. The peculiar applicability of these factors to obstetrics was developed, with detailed experience in 2,724 cases of obstetric use in one institution.

Rectal Ether and Oil—DRS. J. T. GWATHMEY, New York, and C. O. MCCORMICK, Indianapolis.

These authors discussed their subject under the following headings:—History of method. Comparison of inhalation and rectal administration of ether. Statistics. Modifications. (Substituting oral administration of barbitals for intramuscular injections of magnesium sulphate. The patient's distress as a criterion for the time of administration of drugs. Substituting pressure instillation for the gravity method). Analysis of drugs. Pentobarbital sodium. Paraldehyde. Ether. Quinine. Oil. Statistics of new method.

Vinyl Ether Obstetric Anæsthesia for General Practice—Dr. WESLEY BOURNE, Montreal. This paper will appear in the December issue.

Cyclopropane Anæsthesia in Obstetrics (Lantern Demonstration—Dr. R. T. KNIGHT, Minneapolis.

Advantages: (1) Pleasantness: It has a sweet, slightly pungent odour. It is non-irritating if not overpressed. (2) Rapidity: It produces analgesia for each pain in one or two inhalations. (3) Potency: It is powerful enough to produce complete anæsthesia with a great excess of oxygen. Mother and babe are therefore well oxygenated and resuscitation troubles are minimized. (4) Selectivity of action: (*a*) Even profound anæsthesia does not diminish uterine contractions. (*b*) In Cæsarean section the bowel lies contracted and out of the way. (*c*) The anæsthesia does not contribute to vasomotor shock. (*d*) The babe's resuscitation is not hampered by an inhibited respiratory centre. (5) Relaxation: Its rapid complete relaxation of striped muscle lessens the necessity for episiotomy, aids instrumental delivery and permits abdominal section without ether. Disadvantages: Bleeding is temporarily slightly more from cut skin and striped muscle but is no more from the uterus than under other anæsthetics.

Ethyl Ether, Chloroform, Nitrous Oxide and Ethylene Anæsthesia in Obstetric Analgesia and Anæsthesia—Dr. E. W. BEACH, Philadelphia.

Dr. Beach discussed the indications and contra-indications of these agents, and the advantages and disadvantages of each of these more commonly used agents in obstetric procedures. The effects on the mother and child, together with the effect on the course of labour was also dealt with.

SECTION ON PÆDIATRICS

This Section convened on June 12th under the joint chairmanship of Dr. A. Graeme Mitchell, Cincinnati, for the United States, and Dr. Alan Brown, Toronto, for Canada.

In his Chairman's Address DR. MITCHELL took as his subject "The Critical Interpretation of Clinical Observations".

Starting with the premise that while figures don't lie they can deceive in the hands of those who do not know how to use them, Dr. Mitchell made a plea for physicians to learn something of the statisticians' methods. It was not necessary for them to become mathematicians, but they should use the best methods for analyzing the results of their work. They need not, necessarily, know the origin of the mathematical devices employed, but might accept them on faith, as they do their instruments.

Dr. Mitchell urged his hearers to survey their material with a critical eye, making sure that their methods of observation are rigid; and that their information from other sources is accurate. In many cases, proper use of statistical devices shortens the investigator's work, by indicating the amount of material necessary to elicit significant information. To illustrate this point Dr. Mitchell told of a study of the effect of scarlet fever antitoxin on the development of complications. In a study of 196 patients he applied a mathematical test to his results. It showed him that the probability that they were not due to chance was more than 500 million to 1. He then compared this small study with a similar one in which 5,000 cases were used and when the same test, a special application of the theory of probability, was applied, it was found the odds against chance alone were 400 million to 1. In short, with 196 patients, practically the same conclusions were reached as with 5,000.

Sometimes statistical methods can decide the value of methods of diagnosis and treatment and lead to the adoption of better technique. For all these reasons they should be used more than they now are. A final warning, however, was necessary that statistical analysis does not obviate the necessity for thought and judgment.

Progress and Problems in Endocrinology—DR. R. G. HOSKINS, Boston.

Dr. Hoskins, who is director of the Memorial Foundation for Neuro-Endocrine Research at Harvard Medical School, reviewed recent advances in knowledge of the glands and their secretions, all of which are important in the everyday work of the pædiatrician.

For instance, biologists have recently announced the discovery of a hormone in the pituitary gland that appears to control maternal instinct. The part it may play in human psychology is worthy of consideration. Of even more direct interest is the new evidence for the influence of the thymus gland on growth. The only hope for understanding these problems is in research by child specialists on their human material. Most urgent is the need for study of hormones as factors in personality, and this is a field in which the child specialist can do most, since the most fruitful period at which the study can be made is in the years when personality is in the making.

Most of the hormone relationships between mother and child have yet to be elucidated. How does the infant fare in the change from the influence of his mother's glands to his own? When does the transition take place? What could be done for an unthriving infant by endocrine treatment of the mother? Could feeding formulas be supplemented by hormones?

Further complex factors in endocrine research that need clarification lie in the inter-relationships of the glands. Not only does each gland have its own effects, but there is interaction among them, and, further, endocrinologists have recently reported the discovery of "antihormones," substances that neutralize the effects of glandular secretions, thus protecting the body against oversupply.

The endocrinologist is somewhat bewildered by the multitude of fascinating problems opened up before him. All these problems may be studied in the laboratory up to a certain point, but the translation of laboratory work into practical useful knowledge will have to be done by practising physicians, and it is imperative that pædiatricians as a group should come more vigorously to grips with the problems of endocrinology.

Cyanosis of the New-Born—DRS. ALAN G. BROWN and EDWARD A. MORGAN, Toronto.

This paper dealt from a purely clinical point of view with the various causes of cyanosis in the new-born. The relative importance of various pathological conditions in the causation of cyanosis was discussed, particular attention being paid to atelectasis, persistent thymus, cerebral œdema, tetany of the new-born, and intracranial hæmorrhage. The recognition of these conditions and their treatment were discussed.

Therapeutic Results with the Ketogenic Diet in Urinary Infections—DR. H. F. HELMHOLZ, Rochester, Minn.

The requirements necessary to bring about a bactericidal urine—a minimum of 0.5 per cent beta-oxybutyric acid and a *p*H of 5.5. Conditions that interfere with the success of the diet:—functional incapacity in one or both kidneys to put out beta-oxybutyric acid and a urine of low *p*H; inability of the patient to take diet or to absorb fat. Results of diet in infections associated with urinary stasis and results in chronic infections without stasis were given.

Pulmonary Collapse in Children—DR. GLADYS L. BOYD, Toronto. This paper was illustrated by a scientific exhibit.

The various types of pulmonary collapse occurring in children that have been recognized in recent years were considered. Special consideration was given to the massive type occurring after operation and the lobar type characterized clinically by the triangular shadow seen in the roentgenogram. The possible significance of the latter in the etiology of bronchiectasis was considered.

Iron and its Availability in Foods—DR. PEARL F. SUMMERFELDT, Toronto.

The availability of iron in a number of the foods most frequently used in the feeding of infants and children has been determined both chemically and biologically. The results obtained indicate that only a varying proportion of the total iron present in foods is available for the production of hæmoglobin. It is evident therefore that the value of different foods in the prevention and cure of anæmia must be regarded in terms of the amount of available iron and not of the total iron present.

When Pædiatricians Take Inventory—DR. F. P. GENGENBACH, Denver.

The birth rate of the United States has been declining about twelve years, and it is said that since the census of 1930 the decline has been at the rate of 100,000 a year. Less children ultimately means less mothers to have children. In a specialty limiting its work to children, an inventory seems pertinent, to visualize what changes have already occurred and what changes are forecast in the practice of pædiatrics and in the teaching of pædiatrics in medical schools to meet those changes. Is the trend toward the pædiatrician actually becoming "a general practitioner with an age limit," or toward his work becoming still more highly specialized, with his reputation and standing in the community protected by authorized certification? To determine, if possible, these changes, questionnaires were sent to a large number of pædiatricians representing a cross section of the country. The results were discussed and suggestions offered.

Milk Allergy and its Basic Treatment—DR. B. RATNER, New York.

This article went into the clinical and historical side of milk idiosyncrasy, giving the reasons for the use of denatured milk and showing that the lactalbumin proteins

are responsible for most cases of milk idiosyncrasy cases and that casein plays a minor rôle. The paper showed that evaporated milk is the milk of choice in milk idiosyncrasy cases and that some of the other proprietary milks are highly inadequate.

Allergy and Immunity in Childhood Tuberculosis—DR. H. P. WRIGHT, Montreal.

This dealt with the subject under the following headings:—Older conception of tuberculosis and B C G. Newer fashions from Minneapolis. The tuberculin reaction, with report of some experimental clinical work.

The Allergic Theory of So-Called Thymus Death—DR. G. L. WALDBOTT, Detroit.

Clinical observations lead to the view that "thymic death" is identical with allergic shock. The mechanism of allergic shock in man. and the factors leading to shock were described. Non-protein substances, particularly drugs and anæsthetics, give rise to a syndrome identical with that following injections of serum and pollen. A follow-up study of thirty children with roentgenologically enlarged thymic glands disclosed the manifestations identical with those of the allergic constitution. The autopsy of a relatively large group of cases of sudden deaths in which hyperplastic lymphoid tissue was present and no organic cause of death was demonstrable revealed certain lesions that link this condition definitely with allergic shock and early asthma. These lesions probably represent primary urticarial wheals in the alveolar spaces of the lungs, which arise suddenly following absorption of antigenic substances. Their presence accounts for the other pathological changes found and for asphyxiative death.

The Inadequacy of Present Dietary Standards—DR. F. F. TISDALL, Toronto. This paper will appear in the December issue.

The Body Type in Negro Children (Lantern Demonstration)—DR. L. T. ROYSTER, University, Va.

Ten thousand negro school children were measured for height and bi-iliac diameter, and their index calculated. A mean index was likewise calculated for each sex and each age group from six to sixteen, inclusive, and these compared with similar studies on white children by Lucas and Pryor as regards body type. The negro showed in both sexes and at all periods an index definitely lower than white children.

The Diagnosis of Congenital Syphilis—DRS. A. H. PARMELEE, Oak Park, Ill., and L. J. HALPERN, Chicago. This paper was illustrated by a scientific exhibit.

A study of 104 infants of syphilitic mothers for the purpose of finding the most reliable means of diagnosis. Physical, roentgenological and serological examinations were made during the new-born period and at six weeks, three months, six months and one year, and the results compared. The results revealed the preeminent importance of roentgenographic evidence of osseous lesions in the diagnosis of congenital syphilis. Of the group, 64.4 per cent were considered positively infected; in 95 per cent of these the roentgenograms showed evidence of osseous lesions, while only 29 per cent gave positive serological tests.

Systemic Thrush Infection—DR. F. W. SCHULTZ, Chicago.

An ordinarily mild thrush infection may become systemic. The invasion generally takes place in very early childhood. If it becomes a blood stream infection it is extremely resistant to all forms of treatment. Skin lesions become very extensive and are characterized by great chronicity and resistance to local forms of treatment. There are characteristic constitutional and gastro-intestinal symptoms. Dwarfing and complete loss of hair are peculiar to this form of sepsis. Four cases of this rare disorder were reported.

A Study of Immunization Against Scarlet Fever in Charitable Institutions and Public Schools of Philadelphia—DR. J. N. HENRY, Philadelphia.

For the past three years first children in charitable institutions and now in public schools have been immunized against scarlet fever. Some 10,000 Dick tests have been made and some 4,000 children inoculated without the development of scarlet fever in any child pronounced immune by the Dick test or found susceptible and injected, with two striking exceptions. These two children could not be immunized either by attacks of scarlet fever or by administration of toxin.

The Development of the Therapeutic Use of Forced Perivascular (Spinal) Drainage—DR. G. M. RETAN, Syracuse, N.Y.

The development of physiological principles used were discussed. The development of the application of these principles in the treatment of certain infections of the central nervous system were described. This was followed by experiences in the treatment of Sydenham's chorea, of acute poliomyelitis both in the human disease and in that produced experimentally in Macacus rhesus, and a short discussion of the possible use of this method of treatment in cases of encephalitis. A discussion followed of procedure including technique, the element of safety, early recognition of untoward events and a summary of the results that have been obtained.

Active Immunization Against Poliomyelitis: Experimental and Human Studies—DRS. M. BRODIE and W. H. PARK, New York.

In the Macacus rhesus monkey, experiments with virus serum combinations, subinfective doses of virulent virus, attenuated virus and virus rendered non-infective with phenol and solution of formaldehyde showed that poliomyelitis virus suspensions inactivated with solution of formaldehyde gave satisfactory results, and the immunity compared favourably with that developed by convalescent animals and those immunized with virulent virus. When tested in 34 children it was found that, with 5 c.c. amounts, 20 out of 21 developed considerable antibody response, which was evident within a week, reached its height in approximately four weeks and lasted at least five months. The amount of antibody was greater than that developed by three convalescents. Vaccination of hundreds of children and contacts was now being carried out in an endemic focus in California.

Meningococcic Meningitis in Children—DR. J. B. NEAL, New York.

Meningococcic meningitis in non-epidemic periods is essentially a disease of childhood. The symptomatology in older children follows closely that of adults. In the first year of life, however, the symptoms are distinctly different. This results in the diagnosis of meningococcic meningitis in infants being unduly delayed. This delay in diagnosis is undoubtedly responsible in a large degree for the high case fatality in infancy. A discussion followed of the symptoms of meningococcic meningitis, with special reference to those occurring in infancy, and of the treatment of meningococcic meningitis in children. The relative value of ventricular and cisternal punctures, especially in infants, was compared.

SECTION ON NERVOUS AND MENTAL DISEASES

This Section convened on June 12, under the chairmanship, for the United States, of Dr. H. Douglas Singer, of Chicago, and of Dr. A. T. Mathers, of Winnipeg, for Canada.

DR. SINGER, in his presidential address took as his subject "Research in Psychiatry".

Intensive study by practising physicians on individual cases is the great need at present in the field of psychiatry. Laboratory research has been more in the fields of psych-

ology and physiology than psychiatry, which primarily has to do with treatment. Valuable as the psychological and physiological approaches are in explaining mechanisms in the formation of symptoms, they cannot explain why the symptoms arise. Psychiatric research is concerned with the underlying cause of the illness and the psychiatrist should not rest content with psychological explanations if there is any prospect that the cause may be remedied.

Advances in other fields of medicine have led and not followed laboratory discoveries; it seems logical that psychiatry will repeat the story. Taking as an illustration of problems in need of clarification, the mental illness called manic-depressive psychosis, in which the person swings from mania to a deeply-depressed state, Dr. Singer showed how difficult it is to define it. This condition may occur with or without bodily disease, and may be expressed in a variety of forms, depending apparently on the personality of the patient. The occurrence of the same feature under such different conditions seems to indicate that it is not a single disease but a particular location of damage or defect in the structure of the integrating machinery of the body.

In other forms of mental illness in which deterioration occurs, there is great need to define just what has been lost. Research on this point would help to classify these diseases and possibly even help us to learn the seat of the damage.

The prime function of psychiatric research is the discovery of the mechanisms that permit the development of an illness, no matter what the precipitating or concomitant circumstances. The practising physician will, of course, use for therapeutic purposes all available means of ameliorating and modifying favourably the symptoms of an illness for which he is consulted, even if he does not know the actual cause or nature of the illness. His observations and results, however, if adequately recorded and evaluated, may furnish clues to the causes.

DR. MATHERS' Address dealt with "Medico-legal Relationships".

Ventriculography with Colloidal Thorium Dioxide—DRS. W. FREEMAN, H. H. SCHOENFELD and C. MOORE, Washington, D.C.

An opaque liquid medium for exploration of the ventricles outlines them completely, does not alter the pressure relationship or favour collapse of the brain, and tends to sink to the portion of the ventricle nearest to the x-ray film, thus giving sharp definition. Colloidal thorium dioxide is relatively non-irritating when introduced into the ventricles, and in normal cases is eliminated in about two hours. In most cases a mild meningeal reaction occurs, but this often is less than the reaction observed after pneumo-encephalography. The cellular reaction produced in the cerebrospinal fluid consists almost exclusively of large mononuclears. No damage to the brain has been observed in cases coming subsequently to autopsy, but the granular colloid material is seen free in the subarachnoid spaces phagocytized by the histiocytes. Colloidal thorium dioxide has been used in twenty cases the past eighteen months without disastrous results.

Encephalographic Studies in Extrapyramidal Disease—DRS. S. P. GOODHART, B. H. BALSER and IRVING BIEBER, New York.

The encephalograms of seven cases of Little's disease, three cases of Wilson's disease, two cases of Huntington's chorea, one case of dystonia musculorum deformans, and one case of post-encephalitic Parkinsonism were studied. The cases of Little's disease showed either internal or external hydrocephalus, or both. Extensive cortical atrophy was found in the cases showing external hydrocephalus. In the cases of Wilson's disease (hepaticolenticular degeneration) there was found a moderate degree of internal hydrocephalus without external hydrocephalus. The two cases of Huntington's chorea (chronic lenticular degeneration) showed both internal and external hydrocephalus in marked degree with extreme cortical atrophy. The case of dystonia musculorum deformans showed slight internal and marked external hydrocephalus, with extreme cerebral and cerebellar atrophy. The external hydrocephalus and cortical atrophy, both of the cerebral hemispheres and cerebellum, was so marked as to present a startling picture.

Meningitis: A Comparative Study of Various Therapeutic Measures—DR. C. J. TRIPOLI, New Orleans.

This was a survey of the various types of cases of meningitis admitted and treated in the State Charity Hospital of Louisiana during the last ten years. These had been studied from the standpoint of etiology and diagnosis, with special reference to the advantages and disadvantages of various types of treatment The cases included those of cerebrospinal fever, septic or purulent, and tuberculous meningitis. In addition, the autopsy protocols had been reviewed in order to evaluate the clinical observations.

The Etiological Factors in Multiple Sclerosis —DR. T. J. PUTNAM, Boston.

The histological features of the lesions of multiple sclerosis have been produced experimentally in animals in two ways; by the injection of minute doses of tetanus toxin, and by obstruction of cerebral venules. Thrombi and obstructed vessels have been observed in the lesions of multiple sclerosis and in those of "post-infectious encephalomyelitis," apparently an acute form of the same pathological process. It has been recognized, although rather vaguely, that there may be an association between the exacerbations of multiple sclerosis and infections, pregnancy and accidents. Recent clinical investigations have shown that, although the clotting time is usually within normal limits in cases of multiple sclerosis, the coagulability of the blood is greatly increased by the administration of epinephrine or of typhoid vaccine, as compared with controls. There is therefore probably a fundamental abnormality in the blood in multiple sclerosis, which interacts with endogenous or exogenous factors to cause thrombi in cerebral venules.

Experimental Ptosis in Monkeys and Chimpanzees: The Synergic Action of Third Nerve and Cervical Sympathetic—DRS. WILLIAM DEG. MAHONEY, New Haven, Conn., and DONAL SHEEHAN, Manchester, England.

Ptosis produced in monkeys by division of the oculomotor nerve begins to diminish a few days after operation. Complete recovery of the upper eyelid movements upward occurs within three weeks. During this period, extirpation of the superior cervical sympathetic ganglion is followed again by closure of the eye and complete immobility of the upper eyelid. The recovery from ptosis after division of the oculomotor nerve is dependent on the smooth muscle in the upper eyelid supplied by sympathetic fibres. Such an explanation is supported by the remarkable elevation of the half closed upper eyelid in monkeys during periods of extreme excitement. Regeneration of the divided oculomotor nerve in the monkey occurs early and is completely established within three months. Proof that this recovery is due to regeneration of the oculomotor nerve was established by a second transection of the visibly regenerated nerve, which caused occurrence of complete ptosis and internal and external ophthalmoplegia.

Report of a Case of Alzheimer's Disease with Neuropathological Observations—DR. J. A. HANNAH, Toronto.

A woman was admitted with complaints of periods of restlessness alternating with periods of depression and, at times, periods of violence. Until twelve years prior to admission she was considered normal. Following the death of her mother she began to develop forgetfulness and became less careful about her work and appearance and is said to have had some form of seizures not absolutely typical of epilepsy. The dementia progressed until four years prior to admission, when there seemed to be a period of arrest, during which she was free of seizures and the dementia did not progress as rapidly. Eleven days prior to admission she became violent and restless. In the

hospital she showed signs and symptoms typical of Alzheimer's disease She died at the age of 53 of general debility and hypostatic pneumonia. The autopsy and microscopic examination revealed the pathological changes described as found in Alzheimer's disease.

Post-Traumatic Narcolepsy—DR. G. W. HALL, Chicago.

Dr. Hall dealt especially with narcolepsy following injuries to the head. This condition was rarely mentioned in medical literature before the World War, though it was brought to the attention of the medical profession in 1877. Many so-called spontaneous cases were reported before the war, however, and many cases have been reported as following influenza and lethargic encephalitis, or "sleeping sickness," in the epidemics just after the war. The first recognizable case was described by Dickens, in "Pickwick Papers" in 1836, as depicted in his fat boy, Joe, who went to sleep while serving his guests, and on another occasion while masticating a large piece of pie, only to finish his task after being awakened by Mr. Wardle.

Dr. Hall reviewed briefly a number of cases, dividing them into two groups: those in which the victim not only had attacks of sleep, but would become rigid for several minutes if surprised or shocked in any way, and those in in which the sleepy spells were the only difficulty. In all the cases, the persons had been injured; many were soldiers struck by shot and shell. A case seen by Dr. Hall in his own practice was that of a young man knocked down by an automobile. He received a scalp wound, but did not lose consciousness and went home alone. Three weeks later he began to have attacks of drowsiness several times a day He fell asleep while eating or driving a car; he also had the attacks of rigidity, once in the excitement of catching a large fish. This man has been helped by taking ephedrine, but his attacks return the moment he stops the medicine.

Nothing is known of the cause of this strange disease. Dr. Hall was unable to find any records showing that brains of its victims had ever been studied after death, nor did he find any adequate explanation offered by any other writers on the subject.

The Onset of Post-encephalitic and Traumatic Behaviour Cases—DR. E. D. BOND, Philadelphia.

In a group of 160 cases in children, brought together because of behaviour disorder, a study of the incidence of cerebral infection and trauma brings out the importance of apparently trivial brain damage in childhood diseases and accidents.

A Study of Activity After Recovery from Rickets: An Experimental Study—DRS. L. H. ZIEGLER and ARTHUR KNUDSON, Albany, N.Y.

This study of rickets was undertaken to learn whether, in addition to the after-effects in the bones, there are psychobiological sequelæ. Numerous reports indicate that the disease renders children backward or even alters the size of the brain. No adequate studies have been reported giving the behaviour of adults who, in their childhood, had had rickets. This experimental study with rats reports their activity (measured by revolving drum cages attached to a cyclometer) after recovery from various degrees of rickets. Rickets was induced at various points in the life cycle. Animals that had been rachitic were generally less active than the control animals fed a normal ration. Neuropathological and biochemical studies of experimental and control animals have been made. The possibility that dietary deficiency, especially at certain critical points in the life cycle, may be a potent etiological factor in modifying behaviour deserves more study.

Mental Depression as a Result of a Life Experience—DR. NIELS S. ANTHONISEN, Belmont, Mass.

People do not develop the depressed mental state seen in some types of insanity out of a clear sky.

Dr. Niels S. Anthonisen, of the staff of McLean Hospital, Waverly, Mass., discussed this question before the section on nervous and mental diseases. He took 40 consecutive hospital patients and studied their personalities as they were before mental disease set in, the factors that actually precipitated the disease, and the course of the illness. In 34 of the 40 cases, it was found that the persons had always been poorly adjusted socially. They were sensitive, shy, awkward; felt lonely and unpopular. Some were aggressive and overanxious to please, characteristics that masked their fundamental sensitiveness. Whereas it is traditional to consider changes of mood as spontaneous in such persons, close questioning revealed that the change was always the result of some event of an encouraging or discouraging nature. It therefore seems better to regard such persons as extraordinarily susceptible to "depressive reactions" than to consider them constitutionally and unconditionally depressed.

The other 6 cases were in persons who had apparently been well adjusted as long as their life situations were favourable, but who when the conditions were changed had difficulty in regaining an even tolerable adjustment.

When it came to studying the direct causes of the mental illness, significant factors were found in all but two cases, and in these no information could be obtained. In most cases these precipitating factors were dramatic events, such as impending financial disaster, frustrated love affairs, fear of being dishonoured, and childbirth. None of the cases following childbirth seemed to be due to the physiological events, but rather to psychological factors, such as increased family strain or dislike of the child. Many of this group became better as soon as they were in the hospital, where they were free from outside difficulties. Twenty-three of the 40 recovered, were improved or made a comfortable adjustment in the hospital, but in every case a change took place in the relationship between the person and the environment; either the situation changed or the person changed his or her attitude toward it. In none of them did recovery take place without fulfilment of some need of the person.

The Intensive Treatment of Morphine Addiction—DRS. T. KLINGMAN, Ann Arbor, and W. H. EVERTS, New York.

Success in curing a little more than half of a group of drug addicts by a new method was reported by Drs. Theophil Klingman and William H. Everts, Ann Arbor, Mich. They believe they have devised a rapid, simplified, painless and safe method of relief from the craving of narcotics. Two drugs are used: hyoscine and pilocarpine. The authors pointed out that they did not originate the use of these drugs in morphine addiction, but have modified the method of giving it.

The course of treatment lasts from six to eight weeks, beginning with an intensive period of 48 hours. Hyoscine causes a mild delirium and has a peculiar effect of washing out of the mind all memory of events during the treatment, and, being somewhat hypnotic, tends to allay pain; the pilocarpine is given after the hyoscine and quickly dispels the delirium.

After the intensive treatment, the patient's mental state and environment are carefully investigated and every possible adjustment is made.

Fifty-seven addicts, 50 of them severe cases, were treated in the manner outlined. Among them were eighteen women, of whom 12 were school teachers. Twenty-four men were in the professions and 15 in business. Forty-eight were persons who were badly adjusted to life, the type that makes up the largest number of addicts and the group most difficult to cure. In sick persons the sense of inferiority leads to addiction as a means of escape from an unhappy environment. The remaining 9 had become addicted through taking narcotics to allay pain from physical disease.

Thirty-one of the 57 are now known to be free from the drug habit; seven relapsed after having been free for from three to ten months. Nineteen could not be located, to learn results of the treatment after three and a half years.

The Psychiatric Hospital as an Institution of Learning—DRS. C. C. BURLINGAME and C. P. Wagner, Hartford, Conn.

This paper recounted the results of a four-year experiment in developing an atmosphere of learning in a psychiatric institution. A wide curriculum, with graded classes ranging from the simplest manual arts to university courses was offered. Studies of a more cultural nature were included, to stimulate interest in the patient while he is in hospital and to give him added poise and security after he leaves. A well-balanced program of physical education was correlated with the intellectual pursuits, to build up the patient physically and provide recreational outlets. By close cooperation between these instructors and the psychiatrist the patient 's physical, psychological and emotional needs, as well as his special abilities and disabilities, were studied, and he was assigned to classes to suit his particular needs. The promotion from one group to another depended on the patient's improvement in his class work. Careful consideration was given to the technique of introducing the patient to his classes.

A Clinical Study of Seven Cases of Nervous Complications Following Spinal Anæsthesia—DRS. S. BROCK, A. BELL and C. DAVISON, New York.

This study dealt with two instances of benign aseptic meningitis, one with repeated lymphocytosis and normal sugar content in the spinal fluid, the other with repeated spinal fluid polynucleosis and absence of sugar; one case of poliencephalitis with slight residual signs; two cases of cauda equina neuritis and myelitis, with one fatality; an instance of rapidly fatal transverse myelitis, and a case of lumbar radiculitis with almost complete recovery. Analysis pointed to more than one etiological factor: (1) a direct immediate chemotoxic effect on unusually sensitive tissues; (2) a second factor (virus?), exemplified by the course of a case of cauda equina neuritis and myelitis, in which a stationary period was followed months later by the development of fatal transverse myelitis. The different types of meningeal reactions also spoke for more than one etiological factor. The histology of the cord in one case was of unusual interest.

The Simulation of Intracranial Neoplasm by Lead Encephalopathy in Children—DRS. P. C. BUCY and D. N. BUCHANAN, Chicago.

Three cases of lead intoxication in children were presented. In all instances definite signs and symptoms of increased intracranial pressure severe enough to raise the question of possible intracranial neoplasm were present Two of the cases were treated by suboccipital decompression, one by ventricular puncture and repeated lumbar puncture. The differential diagnosis of lead encephalopathy and intracranial tumour, and the proper treatment of lead encephalopathy with increased intracranial pressure were discussed.

Subtemporal and Suboccipital Myoplastic Craniotomy—DRS. W. CONE and W. PENFIELD, Montreal. This paper will appear in the December issue of the *Journal*.

The Clinical Aspects and Treatment of Chronic Subdural Hæmorrhage—DR. F. C. GRANT, Philadelphia.

Dr. Grant discussed a series of cases of chronic subdural hæmorrhage in which this condition was the only intracranial disturbance. The incidence of subdural hæmorrhage appearing immediately after injury to the brain, as laceration, was not considered. The theories as to the production of chronic subdural hæmorrhage were dealt with, as well as the symptoms, diagnosis, and the surgical measures indicated in the treatment.

Paroxysmal Neuralgia of the Tympanic Nerve—DR. T. C. ERICKSON, Montreal. This paper will appear in the December issue of the *Journal*.

Craniocerebral Trauma: A Pathological and Clinical Classification—DR. C. H. MOORE, Birmingham, Ala.

The justification for this review is the simplification of choice of treatment. Cranial injury is relatively unimportant except in its relationship to the underlying cortex and blood vessels. Cerebral injuries may be classified as concussion, œdema, laceration and hæmorrhage. The point is made that these pathological states are often merged, but that œdema, as evidenced by increased intracranial pressure, is most often the factor to be considered so far as treatment is concerned. The pathological physiology of the production of œdema was discussed. Clinically, these cases may be classified as (1) those cases in which no demonstrable increase in intracranial pressure exists or develops, and (2) those cases in which there is an increase in intracranial tension. Treatment, whether operative or non-operative, is based on the degree of intracranial pressure.

Hospital Service Department Notes

The Status of Nurse Anæsthetists in Canada

This Department has had occasion recently to ascertain the status of nurse anæsthetists in the various provinces. The employment of nurses with special training for the administration of anæsthetics has been developed to a considerable extent by many large hospitals and clinics in the United States, but, except in certain public hospitals in one of our larger cities, very few nurse anæsthetists have been employed in Canada, except, of course, in emergencies in rural practice. The following epitomizes the status of the nurse anæsthetist in the various provinces.

British Columbia—

Not recognized by legislation nor approved by the College of Physicians and Surgeons.

Alberta—No legal status.

Saskatchewan—No legal status.

Manitoba—No legal status.

Ontario—

No pronouncement by the College of Physicians and Surgeons and no direct reference in the Medical Act, but there is a strong presumption that the appointment of nurse anæsthetists would be disapproved by the College.

Quebec—

Administration of anæsthesia is considered a medical procedure, and only a Licentiate of the College has the right of so doing. Recently, certain hospitals employing nurse anæsthetists were notified that anæsthetics must be administered only by qualified physicians.

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

New Brunswick—

No legal status. The new Hospital Act proposed a few years ago was drafted to provide for the nurse anæsthetist, but for various reasons there was sufficient opposition to defeat the measure.

Prince Edward Island—

No legislation respecting nurse anæsthetists.

Nova Scotia—

Neither legal recognition nor approval by the Provincial Medical Board. However there is special legislation which would permit the Victoria General Hospital, Halifax, to employ nurse anæsthetists, should occasion arise.

There is a movement in some of the states to make it illegal to employ nurse anæsthetists, although this movement is being combated vigorously by the Nurse Anæsthetists' Association. The American Hospital Association would seem to be cognizant of the dual viewpoints, but the trustees, at a recent meeting, expressed opposition to any legislation which would *prevent* a hospital from employing a nurse anæsthetist should it so desire.

A New Sanatorium at Fort William

A much needed sanatorium for the care of tuberculous patients was opened at the head of the Lakes on May 26th. There has long been a need in this area for an institution of this type, and the building now erected should prove exceedingly satisfactory. Built upon spacious grounds on the outskirts of the city, it is a three-storey fireproof building with accommodation for 100 patients. The nurses' home and the power and laundry plant have been erected separately from the hospital proper.

The new sanatorium is up-to-date in every particular, and has been designed to meet the special needs of New Ontario. The usual open porches on the southern exposure have been omitted, except for uncovered "step-back" verandahs at the eastern and western ends of the building. However, the patients' rooms, all of which are heated and are nearly all on the south side, have large three-tier windows, the two upper portions of which drop down to the floor. The sunlight may be controlled by Venetian blinds. All patients are housed on the two upper floors, there being 16 four-bed wards, 12 two-bed rooms and the same number of single rooms. All rooms are radio-equipped. The ground floor—there is no basement—is entirely administrative and houses the offices, a concert room or lobby, the roentgenological department, dining room, kitchen and interns' quarters. Food service is by means of heated food conveyors distributed by elevator to the floor diet kitchens. Among the many fine features noticed is the equipment of all beds with sponge rubber mattresses.

The entire plant and equipment, including x-ray, cost in the neighbourhood of $220,000. Considering the excellent fireproof construction and the quality of the equipment, this is a remarkably low figure, and reflects great credit upon the many individuals and firms who have cooperated in building and equipping the hospital, and upon the building committee, the chairman of which was Dr. W. P. Hogarth, of Fort William. The medical director will be Dr. George S. Jeffreys, formerly of London, who will be assisted by a medical assistant and a nursing staff made up of graduates and a few affiliates under the direction of Miss M. Buss, R.N.

Provincial Association Notes

The Alberta Medical Association

The thirtieth annual meeting of the Alberta Medical Association was held on September 16th, 17th, and 18th, 1935, at Edmonton, at the MacDonald Hotel. More than two hundred members were present. The sessions were ably presided over by Dr. D. S. Macnab, of Calgary. The representatives from the Canadian Medical Association were, Prof. J. C. Meakins and Prof. W. V. Cone, of McGill University, Prof. R. I. Harris, of Toronto University, Dr. G. J. Wherritt, of Ottawa, and Dr. T. C. Routley, General Secretary of our Association. For many years our members have listened with much appreciation to the excellent addresses of our visitors from the east, but never with more enjoyment than on this occasion. Each one assisted materially in the success of the meeting.

The unanimous decision of the members to merge the destiny of the Alberta Medical Association with that of the Canadian Medical Association made this annual meeting an epochal one. Our Association will henceforth be known as the Canadian Medical Association, Alberta Division. The Alberta Association is the first one of the provincial associations to take this step, which it is expected will be of much significance in the unification of our profession throughout Canada. Apropos of this move, Dr. T. C. Routley remarked "Alberta's history-making step will be mutually beneficial to the profession and those dependent upon it, if other provinces join. The Alberta Medical Association in taking this step has done far more than its members realize. It will do much to foster and encourage unity in Canada. It will serve as a definite lead to other provinces. I heartily congratulate the medical profession in Alberta for having the vision and determination to take this action." The successful outcome of the reorganization of our profession in Alberta, and the amalgamation of our provincial Association with the Canadian Medical Association, are due in great measure to the untiring efforts of Dr.

J. S. McEachern, past-president of the Canadian Medical Association, and Dr. D. S. Macnab, of Calgary, and of their associates in this work.

The following officers were elected for 1935-1936: *President,* Dr. D. S. Macnab, of Calgary (re-elected); *President-elect,* Dr. A. S. Meneely, Coronation; *Honorary-treasurer,* Dr. C. J. Reinhorn, Bellevue; *Honorary-secretary,* Dr. G. R. Johnson, Calgary; *Librarian,* Dr. Heber C. Jamieson, Edmonton. *Alberta Representatives on the Council of the Canadian Medical Association,* Drs. D. S. Macnab, Calgary; G. R. Johnson, Calgary; L. J. O'Brien, Grande Prairie; B. C. Armstrong, Medicine Hat; G. Reinhorn, Bellevue; B. R. Mooney, Edmonton. *Provincial Editorial Board of the Canadian Medical Association,* Drs. G. E. Learmonth, Calgary, *Chairman;* T. H. Whitelaw, Edmonton; R. B. Francis, Calgary; J. S. Wright, Edmonton; H. W. Price, Calgary, A. Gillespie, Edmonton.

G. E. LEARMONTH

British Columbia Medical Association

The Annual Meeting of the British Columbia Medical Association, which was held in Vancouver, September 19th to 21st, was the most successful yet held. Perfect weather, a group of excellent speakers, and a record attendance combined to make this possible. There were 254 registrations and an attendance of over 150 at the Annual Dinner and the Luncheon.

The speakers on the Scientific Program were Dr. J. C. Meakins of Montreal, who delivered addresses on "Chronic pneumonia", "Visceral infarction" and "Hypochromic anæmia in adults"; Dr. Roger Anderson, of Seattle, who lectured on "Fractures of the hip", with stereopticon and motion picture illustrations; Dr. T. Homer Coffen, Portland, Ore., on "Cardiology and asthma"; Dr. W. V. Cone, of Montreal, whose subjects were "Brain abscess", "Head injuries", and "Spinal cord tumours"; Dr. R. T. Harris, Toronto, on "Hernia", "Chronic osteomyelitis" and "Appendicitis"; Dr. J. Tate Mason, Seattle, "Peptic ulcer"; Dr. Laurence Selling, Portland, "Psychoneurosis and epilepsy"; and Dr. G. J. Wherrett, Executive Secretary, Canadian Tuberculosis Association, Ottawa, "Progress of tuberculosis control in Canada."

Dr. J. C. Meakins, as President of the Canadian Medical Association, and J. Tate Mason, as President Elect of the American Medical Association were guest speakers at the Annual Dinner. The Dinner was preceded by a Golf Tournament at Shaughnessy Heights Golf Club, and numerous handsome prizes presented by local business firms were awarded following the addresses of Drs. Meakins and Mason.

Owing to illness, the president, Dr. A. D. Lapp, of Tranquille, was not able to be present, and Dr. H. H. Milburn, of Vancouver, vice-president, presided over the Annual Meeting, the business meeting being held on September 20th. At this meeting the following resolution, moved by Dr. G. L. Hodgins, was adopted:

> That our Executive be given power to so change our Constitution that we be known as the British Columbia Division of the Canadian Medical Association, and that in addition our Executive take such steps as are necessary to finance this undertaking.

The Manitoba Medical Association Annual Meeting

The annual meeting of the Manitoba Medical Association was held in the Fort Garry Hotel on September 12th with the President, Dr. G. W. Rogers, of Dauphin, in the chair. Distinguished guests present included Dr. J. C. Meakins, President of the Canadian Medical Association, Dr. R. I. Harris, of Toronto, Dr. W. V. Cone, of Montreal, Dr. H. H. Christie, of Esterhazy, President of the Saskatchewan Medical Association, and Dr. J. C. Gillie, of Fort William, President of the Ontario Medical Association. Dr. T. C. Routley, General Secretary of the Canadian Medical Association, addressed the meeting and urged the necessity of better medical organization throughout Canada. He wished the Canadian Medical Association to occupy a position in Canada similar to that held in Great Britain by the British Medical Association.

In his presidential address Dr. Rogers outlined the history of the Manitoba Medical Association and pointed out its future. The election of officers resulted as follows: *President,* Dr. F. G. McGuinness, Winnipeg; *First Vice-president,* Dr. W. S. Peters, Brandon; *Second Vice-president,* Dr. D. C. Aikenhead, Winnipeg; *Members of Executive,* Drs. Geo. Clingan, Virden, and A. S. Kobrinsky, Winnipeg; *Secretary,* Dr. F. W. Jackson; *Honorary Treasurer,* Dr. C. W. Burns; *Auditors,* Drs. Wm. Creighton and A. M. Goodwin.

ROSS MITCHELL

Medical Societies

The Academy of Medicine, Toronto

The Annual Dinner and Stated Meeting of the Academy of Medicine, Toronto, were held in the Academy building on October 1st. The attendance was one of the best recorded for a dinner held on the Academy premises.

Following the dinner, a replica of the presidential badge of office was presented to Dr. M. H. V. Cameron, the Past-President, *in absentia,* Dr. H. C. Wales receiving it for Dr. Cameron.

A portrait in oils of Dr. E. A. McDonald, a Past-President of the Academy, was presented

by Dr. J. Lloyd Burns, representing the Toronto East Medical Association, who had arranged for the painting of this portrait.

It was with great pleasure that the Fellows of the Academy elected unanimously to Life Fellowship, Dr. W. B. Thistle, one of our Charter Fellows, and past Chairman of the Section of Medicine and Section of Pædiatrics.

Among the distinguished guests were the Rt. Hon. Sir William Mulock, Sir Robert Falconer, President H. J. Cody, and His Worship the Mayor of Toronto, who made short addresses.

The address of the new President, Dr. Oskar Klotz, entitled "Tendencies in modern medicine" outlined various phases in the art and practice of medicine, particularly drawing attention to the rôle of the sciences in discoveries of great value to the practitioner, and the function of the Academy in making these available to him. GORDON S. FOULDS

The Winnipeg Medical Society

The first regular monthly meeting of the Winnipeg Medical Society for the 1935-36 term was held in the Medical College on September 20th. Dr. H. D. Morse read a paper on "Hæmaturia" and Dr. J. N. McEachern presented a clinical case which illustrated the complications of mitral stenosis.

ROSS MITCHELL

University Notes

Cambridge University

Dr. John Ryle, physician to Guy's Hospital, has been appointed Regius Professor of Physic in the University of Cambridge in succession to Sir Walter Langdon-Brown, who is retiring on completion of his term of office. Since King Henry VIII founded the Chair in 1540 all the incumbents except one have held medical degrees gained at Cambridge. The exception was John Blyth, the first Regius, who took his M.D. at Ferrara. The twenty-first Regius is a London graduate and the first Guy's physician to be thus honoured. To find a younger Regius we should have to go back more than one hundred years.

Dalhousie University

Dr. H. G. Grant, Dean of the Faculty of Medicine, attended as the representative of the University at the installation ceremonies held on October 5th, for Principal Morgan of McGill University.

Dr. E. W. H. Cruickshank, Professor of Physiology, has been appointed to the Regius Professorship of Physiology in Aberdeen University. He will take up his new duties at the beginning of 1936.

The registration just completed of medical students in the first to the fifth years has reached the total of 187. The largest numbers are in the first and second years, each being approximately fifty. N. B. DREYER

Special Correspondence

The Edinburgh Letter

(From our own correspondent)

The death of Prof. John Anderson, of the Chair of Surgery at St. Andrews University, at the early age of 49 is much regretted not only in Scotland but in many other countries. A native of the north of Scotland, he received his medical education at Aberdeen University. After qualifying, he spent two years in study abroad and on his return was appointed to the staff of Dundee Royal Infirmary. On the outbreak of the war he became surgeon-specialist to the Twentieth Casualty Clearing Station in France and also served temporarily as consulting surgeon to the Third Army. For his valuable work he was twice mentioned in despatches and was awarded the D.S.O. In 1933 he was appointed to succeed the late Prof. L. Turton Price in the Chair of Surgery at St. Andrew's. Professor Anderson's work on the effects of high frequency currents as applied to general surgery is well known.

Sir John Marnoch, honorary surgeon to the King in Scotland, has resigned his appointment, and Prof. James Rögnvald Learmonth, who succeeded him in the Chair of Surgery at Aberdeen University, has been appointed in his place. Professor Learmonth graduated at Glasgow University in 1921, gaining the Brunton Memorial Prize as the most distinguished student of the year. In 1928 he joined the surgical staff of the Mayo Clinic, and was also appointed an Associate Professor of Neurological Surgery in the University of Minnesota.

The Report of the Registrar-General for Scotland for the year 1934 shows that there has been a slight check in the decline of the birth-rate, which is now 18.0 per thousand. The marriage rate, with the exception of 1915 and the three years following the war, is the highest recorded since 1899. It is satisfactory to note that the death-rate and the infantile mortality rate are the lowest ever recorded in Scotland. The estimated population of Scotland for 1934 was 4,934,000. This represents an increase over the estimated total population in 1933 of 22,000; the increase being attributed mainly to the excess of births over deaths.

Sir Robert Philip, the Curator of the Laboratory of the Royal College of Physicians of Edinburgh, in his report for 1934 draws attention to the large amount of material that now exists in the Laboratory for the study of cancer. This material covers all regions of the body and comprises some 10,000 specimens. During the last few years special collections of the more interesting specimens have been made and are available for study by those who are interested in special subjects. Demonstrations were given throughout the year on tumour pathology for the Congress of the Society of British Neurological Surgeons and for the Cancer Control Organization on Cancer in General. These demonstrations were intended partly to show the value of the new photographic apparatus acquired by the Cancer Control Organization for the record of interesting microscopic pictures which were obtained in the course of routine examinations. Research work during the year was concentrated on the study of the "carcino-sarcoma". In this work due account was taken of the normal reaction of the supporting and nourishing tissue to the presence of a carcinoma. It is contended that this reaction might itself develop malignant character, and the whole subject was considered from a general tumour point of view. The conclusion was reached that the boundary between inflammatory change, benign tumour growth, and malignant tumour could not be strictly drawn.

A Departmental Committee has recently been appointed in Scotland to consider the question of Road Safety among School Children. At a recent meeting of the Committee Prof. I. de Burgh Daly, of the Chair of Physiology in the University of Edinburgh, gave evidence regarding the difficulty of making any hard and fast rule as to the amount of alcohol which renders a motorist unsafe as a driver. He said that the difficulty was the individual factor. One man might take a certain amount of drink which would make him wholly drunk in the real sense of the word, whereas another taking the same quantity might show no ill-effects at all. Professor Daly said that he had made no experiments himself on the effect of alcohol on coordination, but had had experience of things which produced the same effect as alcohol. He had been in the flying service during the war, and high flying produced the effects of alcohol in so far as mental processes and response to emergency were concerned. Dealing with the effect of alcohol on fatigue, Professor Daly said that if a man were tired the taking of alcohol would accelerate his rate of fatigue, but if a man had been fatigued and was recovering, alcohol would accelerate the rate of recovery. In response to the Chairman he stated that the ideal to aim at was entire abstinence from alcohol before driving a car.

It has just been announced that the King has approved, on the recommendation of the Secretary of State for Scotland, the appointment of Ernest William Henderson Cruickshank, Esq., M.D., D.Sc., Ph.D., M.R.C.P., F.R.S.E. at present Professor of Physiology in Dalhousie University, Halifax, Nova Scotia, to be Regius Professor of Physiology in the University of Aberdeen in the place of the late Professor J. J. R. Macleod.

R. W. CRAIG.

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The London Letter

(From our own correspondent)

Food-poisoning is bound to fill from time to time a sensational paragraph in the newspapers, but it has been rather disquieting that after an interval of about thirteen years there has been another group of deaths due to botulism. Four of the victims on this occasion had eaten a vegetarian product, "nut-brawn", from a glass container. In another case the poisoning was traced to food prepared at home—a much more ominous place for the deadly toxin of the botulinus bacillus to lurk. Various investigations are now in progress to try and trace more exactly the origin of the contaminating organisms. In view of the very large amount of preserved food now consumed the infrequency of botulism makes an outbreak like the present one more alarming, perhaps, than it should be. Much of the care that is taken over methods of storing and preserving food is due to the energies of the Food Investigation Board, a recent report of whose activities has provided interesting reading. For example, chilled beef can now be brought from Australia and New Zealand, due to the discovery by the Board's workers that the addition of carbon dioxide to the air of the refrigerator store made preservation possible for 60 to 70 days. Iodized wrappers for grapes are found to prevent decomposition and the growth of moulds, while methods of preserving eggs are under critical examination at the present time. It may at once be observed that no encouragement ought to be given to the population to eat preserved foods, but the custom is growing, and it behooves those in charge of the nation's health to see that the tinned product shall be as near to the natural substance in food value as possible. The details of catering and cooking economically are becoming the object of as much research as the actual physiological data upon which modern dietetics, as a science, are based. The British Medical Association has followed up the report of the Nutrition Committee, which aroused so much controversy over first-class protein and kindred matters about two years ago, with a valuable pamphlet telling the housewife how to carry into practice the theoretical scheme of feeding recommended. How to buy and how to

cook food are of greatest importance, and without expert aid on these aspects it is no good even toying with mass experiments in improvement of the nation's food supply. Speakers at the recent meeting of the British Association for the Advancement of Science urged that an adequate ration of food should be the right of every individual. This might well help to solve the agricultural problem, but the average housewife in the poorer classes is in need at present of more help in showing her how to make the best of what is already available. The B.M.A. pamphlet indicates how this can be done.

Uncertainty in world affairs, the possibility of greater socialization and other political and economical problems, serve to make the parent's lot, when faced with careers for his children, a particularly trying one. *The Lancet* recently sought to give him some guidance as regards the medical profession by sending a questionnaire to the 1490 men and women who registered their names as qualified practitioners in 1930. Nearly one-half of these were prepared to state (anonymously) how they had fared in five years and the analysis of the replies brought out many interesting points. About one-half of those that replied are in general practice, one-quarter are engaged in the specialities (in a wide sense), 7 per cent have entered the public health services, and 5 per cent the defence services. Of those in practice nearly half had reached a gross annual income of over £1,000, the limits being £60 and £2,042, with an average of £900. Expenses have to be deducted but even so the prospects appear good on this basis. Those engaged in other branches had not done so well, the delayed earning capacity of specialists being well recognized. The general conclusion from the sample replies received is that the recent graduate is settling into the profession with a substantial degree of success.

A recent report from the Westminster Hospital on the treatment of hypo-pharyngeal cancer by means of combined x-ray and radium therapy recalls the great "bomb" controversy of a few years ago. In the present report, in which irradiation by different wave-lengths is recorded as effective in cases where surgery is obviously of limited value, the authors think that the existing two-gram "bomb" of radium may not be the best possible for the purpose, and they state their intention of increasing the quantity as opportunity occurs. It has just been announced in the press that a new "bomb" containing four grams of radium is to be assembled and tested in the workshop of the Westminster Hospital annex. Thus the wheel has come full circle and the constitution that discarded the four-gram "bomb" a few years ago amid a great deal of protest is now to take up the treatment by radium on this large scale once again. Many factors have had to be considered, and comment at this stage is best withheld while the bare facts are put on record.

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Topics of Current Interest

The United Medical Service, the Civic Medical Centre, and Another Commercial Medical Racket*

Our readers are, of course, familiar with the attempt to practise medicine initiated by the corporation known as the United Medical Service Incorporated. This organization, headed by Dr. Joseph Berkowitz, is a stock company employing physicians on salaries and marketing their wares by means of advertisements in newspapers offering medical care for various conditions at fixed prices. Some time ago a disagreement apparently arose between members of the medical staff and the corporation directorate, which resulted in both physical and mental anguish for the parties to the disagreement. As a result Chicago is now blessed, or cursed, with two organizations—the United Medical Service Incorporated, which endeavours to persist at the old address, and the Civic Medical Centre, which has opened up in a neighbouring headquarters. The latter organization is presumably dominated by physicians, but continues to exploit their services by the same type of advertisements as are used by the parent organization. Yet between parent and child there is little sympathy except for the methods of exploitation, and there seems to be but little chance that the prodigal son will ever go marching home. How well the Civic Medical Centre physicians have learned the tricks of unethical practice is apparent from a recent attempt to exploit the services of one of their members by an unusual route. Not long ago newspapers in Chicago began to carry items relative to the formation of a so-called Chicago Hay Fever Club, formed, it seems, for the purpose of eliminating ragweed and making regular daily pollen counts. The treasurer of the Chicago Hay Fever Club is one Frederick B. Basset, Jr., who is at the same time advertising representative for the Civic Medical Centre. The medical adviser of the Chicago Hay Fever Club, it develops, is one Dr. M. J. Steinberg, formerly a member of the staff of the United Medical Service, Incorporated, and now a member of the staff of the Civic Medical Centre. The president of the Chicago Hay Fever Club is William R. Harshe, who is also publicity representative for the Civic Medical Centre. Evidently the purpose of the Chicago Hay Fever Club is to enlist the interest of the public in hay fever and to obtain a list of hay-fever sufferers. Hay-fever sufferers who applied to the club were promptly referred to Dr. M. J. Steinberg, the medical adviser, without question as to whether or not they had consulted other

* The reader is referred to an Editorial Comment in this issue, entitled "The Canadian Health Institute, Incorporated", which deals with this subject. The "Commercial Medical Racket" has now appeared in Canada. [EDITOR.]

physicians. Once physicians embark on a commercial career, such tricks and chicanery inevitably appear as concomitants of the services they render and menace the proper care of the public whose interest is elicited by their promotional devices.—*J. Am. M. Ass.*, 1935, **105:** 888.

Chemical Warfare Protection

Four resolutions on the subject of chemical warfare were passed at the annual Representative Meeting of the British Medical Association recently.

Three resolutions were submitted by the Kingston-on-Thames Branch urging that instruction in anti-chemical warfare measures should be given to medical students; that similar instruction should be available for post-graduates; and that, in view of the necessity for educating the public in measures of protection against chemical warfare, the British Medical Association should ask for the cooperation of its members.

The chairman (Mr. H. S. Souttar) stated that recently the medical secretary of the association (Dr. G. C. Anderson) and himself were invited to a conference at the Ministry of Health, at which many other bodies of an educational type were represented, to discuss that matter. They found that the Ministry of Health, in conjunction with the Home Office and the War Office, were fully alive to the necessity of educating the civil population in the matter. The authorities wished to make use of the machinery of the British Medical Association for that purpose. Through their divisions and branches they were in an exceptional position for diffusing the necessary knowledge among the medical men of the country. Every conceivable precaution would be taken to ensure that the medical and nursing services of the country and the civilian population were trained in those matters.—From the *Weekly Times*.

The Onion as a Social Problem

In the laboratory of applied physiology at Yale University, H. W. Haggard and L. A. Greenberg[1] have been trying to find why an alliaceous odour persists in the breath after eating onions or garlic. It is generally supposed that, like ether, alcohol, and acetone, the essential oil of onion passes into the blood stream and is aerated from the blood in the lungs, so passing into the expired air. Alternative possibilities are that these oils are secreted into the saliva or that the smell comes from the stomach by way of the œsophagus. Haggard and Greenberg will have none of these hypotheses, and they seem to produce conclusive evidence in favour of their own explanation. Their initial experiment was to give 1.5 g. of raw garlic, chewed and swallowed in the ordinary way and followed by the usual odours for a day or more. The same person then took the same quantity chopped in small particles but enclosed in gelatin capsules. No smell whatever was detected in the breath, except once when the subject belched three hours after taking his dose. The investigators thence passed to quantitative tests, where we need not follow them. But all the results go to show that they are right in thinking that the continuing smell of onions or garlic in the breath arises solely from particles retained in the mouth. These particles cannot be completely removed by mechanical means, to brush the teeth and tongue, to wash the mouth with soap and water or even with a 30 per cent solution of alcohol, will not deodorize the breath. Haggard and Greenberg however are able to propose a remedy which is in fact effective—namely, the rinsing of the mouth with a solution of chloramine, which liberates free chlorine in the mouth and so quickly and completely removes the offending odour. They suggest that many cases of foul breath from other local causes are probably amenable to the same simple treatment, and we hope this may be so. It is salutary, however, to remember the story of the American millionaire who, stimulated by advertisements, spent a large sum on a cure for halitosis, only to find afterwards that his friends did not like him anyway!—Quoted from *The Lancet*, 1935, **2:** 316.

1. *J. Am. M. Ass.*, 1935, **104:** 2160.

Quintuple Birth

"A woman living near New Glasgow, N.S., recently gave birth to five children, all of whom have, however, since died. Dr. F. D. Keyser, of this city, has exhibited to us a photograph of the quintuple babies lying side by side in their 'little bed'. The photograph was sent him by Dr. Hyde, of Truro, N.S., who stated that the children probably would have lived if they had had any chance. The parents were extremely poor, and lived six miles away from where anything could be got for them. There was nothing in the house to even wrap them up in, and the doctor had to take the blind off the only window to make bandages."—*Phila. Med. Rep.*, *The Canada Medical Record*, July, 1880, p. 270.

Three things cannot subsist without three things: property without trade, science without controversy, and a country without punishment.

Speak sometimes in a friendly, conciliatory, manly way, perhaps thou wilt ensnare a heart with the lasso; sometimes speak in anger, for a hundred jars of sugar will on occasion not have the effect of one dose of colocynth.—*Maxim VI* of the Sheik Sa'di of Shiraz.

Abstracts from Current Literature

Medicine

Clinical Observations on the Events Preceding the Appearance of Rheumatic Fever. Bland, E. F. and Jones, T. D., *J. of Clin. Investig.*, 1935, **14**: 633.

The frequent association of tonsillitis and infection of the upper respiratory tract with rheumatic fever has been noted by many clinicians. The authors of this paper agree, in general, with these investigators, noting that the percentage of cases of rheumatic fever preceded by recent infection of the upper respiratory passages may be as high as 75. In spite of this, no proof that any microörganism found in the upper respiratory tract is the cause of rheumatic fever has been presented, so far as they are aware.

It is the purpose of the paper under review to present certain clinical observations on rheumatic fever which are of interest and may prove eventually to be of importance in the consideration of the etiological factors operating in the case of this disease. The paper is based on the observation during the past thirteen years of some 1,200 children and adolescents suffering from rheumatic fever in its various phases at the House of the Good Samaritan, Boston. The period of observation varied from days or months to years. During this period of prolonged observation the evidence of persistent low-grade, sub-clinical, infection has been largely that of a slight pyrexia (rectal), subcutaneous nodules, erythema multiforme, moderate leukocytosis, increased sedimentation rate of the erythrocytes, or prolongation of the auriculoventricular conduction time. It was in this mildly active group that the authors repeatedly observed the importance of respiratory infection in precipitating relapses or recrudescences of the rheumatic process. Recurrent rheumatic fever has been observed at times following infections other than tonsillitis and pharyngitis. Scarlet fever is apparently a frequent precipitating factor. These episodes are closely related to streptococcus infection. Instances of other precipitating infections, frequently associated with or subsequent to ordinary respiratory infection, noted in their series were: "pneumonia" 4, otitis media 5, measles 3, and erysipelas 1. The authors have been impressed by the occasional occurrence of an equally striking, though less frequent, association between other (non-infectious) and apparently non-specific episodes and subsequent recurrent rheumatic fever. Such were cases which followed accidents or operations, and some which could not be attributed to any definite infectious cause. In some cases the intravenous injection of stock typhoid-paratyphoid vaccine seemed to excite recrudescence of the rheumatic process.

The authors conclude that there appears to be no significant clinical difference between the recurrences or recrudescences of rheumatic fever following (1) respiratory infection; (2) other forms of infection; (3) accidents or operative procedures; and (4) a single intravenous injection of typhoid-paratyphoid vaccine sufficient to cause a slight chill and febrile reaction. It is evident that various events precede and apparently influence the appearance of the signs and symptoms of recurrent rheumatic fever. They consider the rôle of such events as non-specific, until more definite information is available as to the etiological agent.

JOHN NICHOLLS

Obesity, Hypogenitalism, Mental Retardation, Polydactyly and Retinal Pigmentation: The Laurence-Moon-Biedl Syndrome. Cockayne, E. A., Krestin, D. and Sorsby, A., *Quart. J. Med.*, 1935, N.S., **4**: 93.

This article furnishes an extensive survey of the literature on this subject to date, as well as reporting two new families with the condition. One family had 10 members, or whom 3, possibly 4 had the disease; the second family had 4 children of whom 3 had it. Neither family gave a history of consanguinity in the parents. The review of the literature reveals the following facts. In all cases except one doubtful one retinal degeneration was present. All cases showed polydactyly, always on the ulnar side of the hand, the fibular side of the foot, and never more than one extra digit was present. Some cases showed symmetrical polydactyly, although unilateral distribution was the commonest. The mental defect was present in all cases, and may be either of the nature of a failure of development, a primary amentia, or the disintegration of a developed mentality. Some of the cases showed the latter type, although the majority showed evidence of mental retardation from earliest childhood. Obesity was present in all cases except one of the authors', and even this lad is starting to become fat. The obesity is of the hypo-pituitary type in almost all cases, although hypogenitalism is not infallibly present. The pathological basis is still undetermined, since no case has come to autopsy. Males predominated over females in the approximate ratio of 3:2. Parents were related in 43 per cent of the cases in which statement was made as to the relationship of parents. If all cases be taken, those in which no inquiry was made as to consanguinity as well as those in which it was, 23 per cent were related. (About 0.2 per cent of marriages are consanguineous in the general population). The condition appears to be due to a recessive factor, but there is also a preponderance of males.

MADGE THURLOW MACKLIN

Surgery

So-called "Liver Death". Boyce, F. F. and McFetridge, E. M., *Arch. Surg.*, 1935, **31**: 105.

Notable work has been done on the association of disease of the liver with disease of the biliary tract since Reimann, of the Lankenau Clinic, in 1917 observed that hepatitis of some degree is a constant accompaniment of cholecystitis of any degree. Surgeons accept without question the association of the two diseases, and they comprehend that the health and safety of the patient following operation for biliary tract disease depend largely on the state of the liver. The immediate factors of mortality include hæmorrhage, shock and embolism, while delayed factors include peritonitis and complications of the respiratory tract. In a certain group more of these factors operate. Most of these patients present an unusually good surgical risk. Many of them die too promptly for the death to be explained on a basis of infection, and too late for surgical shock to play any part; others exhibit no clinical evidence of infection or pneumonia. Autopsy throws no light on the problem.

The authors analyzed 100 "gall-bladder deaths" occurring in the New Orleans Charity Hospital. Twenty-three of these fell into the type under consideration. Following Heyd's grouping of 1924 they added certain sub-groups. Briefly their classification is as follows.

Group 1A.—Death within forty-eight hours with hyperpyrexia. History of long-standing biliary tract infection. None were acutely ill. All were regarded as good surgical risks. Three patients were very obese. B.—Death within seventy-two hours, with hyperpyrexia. All had long-standing chronic infection. A fair recovery for from twenty-four to forty-eight hours, then hyperpyrexia and rising pulse rate. The post-operative carbon dioxide combining power indicated acidosis. C.—A fairly normal course for four to five days, then hyperpyrexia and death within twenty-four hours. History of long-standing biliary tract disease. Both patients were considered to be good risks. Rapidly mounting temperature (to 106° F. and 107° F. by axilla). In both cases some renal factor was present at the end.

Group 2A.—Smooth recovery for from five to ten days, then oliguria progressing to terminal anuria, with symptoms of uræmia, but an absence of the hyperpyrexia noted in group 1. B.—Cardiorespiratory collapse in from sixty to ninety-two hours.

Group 3.—The outstanding feature of the clinical course was deferred oliguria, progressing to anuria and associated with typical changes in the blood chemistry, chiefly in a rise of the amount of the nonprotein nitrogen.

Group 4A.—Cases following gunshot wound and automobile accident. Hyperpyrexia present in all cases. B.—Rupture of the liver following an automobile accident, followed by deferred uræmic symptoms. Autopsy revealed typical degenerative changes within the liver and kidneys. Autopsy was performed in several instances in the other groups. In the first group, the post-mortem changes are limited to degenerative changes in the liver and slight conjestion of the kidneys. In the second group the same hepatic changes are present, plus similar degenerative changes within the convoluted tubules of the kidneys.

Boyce and McFetridge experimented on dogs to elucidate if possible the cause of so-called liver death. They believe that they have proved that the underlying cause of the process is some toxic substance which is water-soluble, which is released by necrosed cells of the liver and the action of which on the kidneys is not specific, but simply a corollary to an overtaxed normal physiological process, the excretion of foreign proteins by the convoluted tubules. Probably the urine, rather than the blood or the tissues, is the most potent source of supply for foreign proteins.

G. E. LEARMONTH

Obstetrics and Gynæcology

A Parallel Study of Labour in Young and Old Primiparas. Nathanson, J. N., *Am. J. Obst. & Gyn.*, 1935, **30**: 159.

White primiparas of thirty-five years and over are compared with a similar group, twenty years and under, in the Woman's Hospital, New York. Dystocia of the inlet was more frequent in the young primipara, and of the outlet in her older sister. Persistent occipito-posterior positions and breech presentations occurred twice as often in the old primiparas. Parturition was of longer duration in the younger group. The average duration of the first stage was 17 hours and 12 minutes for the old primiparas and 12 hours and 48 minutes for young primiparas. The average duration of the second stage was one hour and 34 minutes in the old and one hour and 19 minutes in the young group. Major obstetric procedures, excluding Cæsarean section, were more frequent in the older patients, due to greater incidence of inertia uteri, persistent occipito-posterior positions, and breech presentations.

Cæsarean section was performed in twenty cases, or 10.75 per cent of the old primiparas, while no patient in the younger group was subjected to this operation. In practically every instance Cæsarean section was definitely indicated for reasons other than advanced age. Inertia uteri, pelvic neoplasms, and stillbirths were found more frequently in the older group. There was no maternal death among the young patients, but in the older patients there were three, a mortality of 1.61 per cent. The aver-

age weight for all children born to the old primiparas was seven pounds four and three-fourths ounces as compared to seven pounds three and one-half ounces for the young group. Complications of the third stage of labour were twice as frequent in old as in young primiparas, and toxæmia occurred one and one-half times as often in the old patient as in her younger sister. The duration of marriage before conception did not appear to influence the duration of labour.

No inflexible rules can be laid down for the routine conduct of labour in the elderly primipara. Individualization of each case guided by the experience, judgment, and ability of the attending obstetrician would appear to be the only ideal approach to the solution of the problem. ROSS MITCHELL

Total Versus Subtotal Abdominal Hysterectomy in Benign Uterine Disease. Richardson, E. H., *Am. J. Obst. & Gyn.*, 1935, **30**: 237.

Three major arguments are offered in support of routine total hysterectomy:—

(1) The present incidence of stump cancer, perhaps 3 per cent; (2) the prevalence of focal infections in the cervix; and (3) the assertion that the difference in mortality between total and subtotal hysterectomy is so slight as to be a negligible factor. On the other hand it is contended that the incidence of stump cancer should be interpreted merely as an index of the ill-advised use of subtotal hysterectomy or of neglect in the subsequent eradication of benign cervical stump lesions, since there is no evidence that normal cervices later become cancerous; that in the hands of the average operator total hysterectomy is a more hazardous undertaking; likewise panhysterectomy involves far greater risk of serious operative and post-operative complications, as well as a longer period of morbidity than does the supra-cervical technique.

Attention is called to the reprehensible prevalence of benign diseases of the uterine cervix and their undoubted etiological relation to cancer. The conclusion is that, despite its many advantages, subtotal hysterectomy has today only a limited field of application. The author's simplified technique for abdominal total hysterectomy, designed specifically to guard against the major hazards of this procedure, is recommended. ROSS MITCHELL

Pædiatrics

Chronic Galactæmia: Report of a Case with Studies on Carbohydrates. Mason, H. H. and Turner, M. E., *Am. J. Dis. Child.*, 1935, **50**: 359.

The authors report their study of an infant about six months old who did not gain normally so long as its diet contained milk, and who also showed marked enlargement of the liver, slight enlargement of the spleen and superficial lymph-nodes, a positive van den Bergh reaction, secondary anæmia, osteoporosis, and albumin and sugar in the urine. The sugar in the urine proved to be galactose. Removal of milk from the diet resulted in the disappearance of the sugar and albumin from the urine, decrease in the size of the liver and spleen, disappearance of the van den Bergh reaction, improvement in the blood and in the appearance of the long bones, as well as a rapid gain in weight.

When the diet contained no milk the blood sugar curve remained within normal limits; when each meal contained 200 c.c. of milk and 10 g. of lactose the curve for blood sugar was abnormal, in that the fluctuations were narrow and were due almost entirely to changes in the level of the blood galactose. The level of the blood dextrose remained low throughout the day. The subcutaneous injection of epinephrine resulted in a normal response in the level of the blood dextrose. Insulin caused a fall in the level of the blood dextrose whether there was galactose in the blood or not. On the milk-containing diet the level of the total sugar rose after the injection of insulin, the rise being due to a marked increase in the amount of blood galactose.

The authors suggest that the primary disorder was a lesion or functional disturbance of the liver that lessened its ability to convert galactose into glycogen without impairing seriously its other functions, and that the derangement of the other tissues was the result of relative starvation, due to the continuously low level of the blood dextrose.

JOHN NICHOLLS

Retarded Speech Development. Glassbury, J. A., *Arch. of Pædiatrics*, 1935, **52**: 425.

The first significant utterances made by the infant are the sounds associated with the physical needs of hunger, cold, pain, and wetness. These sounds are at first made at random, but soon become identified with certain acts or feelings and remain in the memory as symbols of those acts and feelings. They become the first conditioned reflexes. In six to eight weeks the range of sounds is increased by the vocal response to pleasurable stimuli, as laughter, on being spoken to, played with, hearing music, or seeing toys. None of these utterances can properly be called "speech". Speaking is learned by imitation. The upper limit of time for "beginning to talk" may be placed at three years, or, occasionally, a little later. The average age is between one and two years. Girls begin to talk two to four months earlier than boys.

The causes of delayed speaking are central and peripheral. The central causes may be generalized as due to depression of the mental faculties; the peripheral causes have to do with some anomaly of development or pathological lesion of the organs concerned in speech or articulation or of the buccal cavity, or with defective hearing.

The treatment is based upon an accurate diagnosis of the cause, and is medical, surgical, or educational. Malnutrition, anæmia, paralyses, atrophies, tics, endocrine disturbances, and emotional instability, must be corrected by medical and hygienic measures, by electrotherapy or physiotherapy. Tumours, adhesions (tongue-tie), adenoids, cleft palate, and harelip will be dealt with surgically. Educational treatment consists in phonetic instruction, which, naturally, must be adapted to the nature of the defect. Vocal gymnastics are indicated in all cases. In dealing with mental deficiency it should be remembered that the physical age is of no significance. Begin speech education as soon as the cooperation of the child can be elicited.

JOHN NICHOLLS

Ophthalmology

Contribution to the Pathology of Sympathetic Ophthalmitis: Sympathizing Ophthalmitis without Sympathetic Ophthalmitis, Inoculation Chancre. Felsenthal, W., *Ann. d'Ocul.*, 1934, **171**: 944.

The condition is a rare one. The author believes there are only 5 analogous cases in the literature. After close scrutiny of these, he has excluded 2, so that there remain only 3 certain cases. He insists upon the importance of "chancre inoculation" (point of entrance). This was first reported by Redslob, who gave it the name of "chancre inoculation" without admitting the possibility of specific infection. The case here reported shows the absolute independence between the inflammatory processes of the two eyes and that the degree of inflammatory infiltration of the sympathizing eye had no influence whatsoever on the development in the healthy eye.

The author comments on the different theories on the pathogenesis of sympathetic ophthalmia; the metastatic theory, Elchnig's theory of the antigen effect on the uveal tissue, the tuberculosis theory of v. Hippel, and the mixed theory of Redslob, by which he describes his case. There is microbic origin with penetration of microörganisms of the conjunctival sac into the wound, development of "inoculation chancre" in the injured uveal tissue, and entry of microorganisms into the body.

The article is illustrated with three figures. There is also a bibliography.

S. HANFORD MCKEE

Glaucoma or Ocular Hypertension in a Pregnant Woman. Disappearance of the Trouble after Spontaneous Miscarriage. Dubois, A., *Ann. d'Ocul.*, 1935, **172**: 142.

This report concerns a young woman of 32 years who developed an ocular hypertension without modification of vision or the visual field. The important fact in the case was the coexistence of the ocular hypertension with pregnancy. The symptoms appeared after pregnancy, and disappeared in the fourth month following spontaneous miscarriage. Dubois thinks that the ocular troubles depended on the pregnancy. Visual acuity which remained excellent throughout decreased the day preceding the miscarriage, as if the imminence of the crisis had increased the symptoms.

S. HANFORD MCKEE

The Pathogenic Problem of So-called Critical Allergic Conjunctivitis. Lagrange, H., *Brit. J. Ophth.*, 1935, **19**: 241.

The writer gives first a historical review, then takes up experimental pathology, endocrine disturbances, sensitization, and the syndrome of so-called critical allergic conjunctivitis. The characteristics of this are as follows. Its *nature* consists of pruriginous cutaneous or mucous reactions, which assume the character of crises. The conditions under which the syndrome occurs consist of identical, climatic, seasonal or environmental circumstances. There is a frequent coexistence or alternation of other anaphylactic signs, including dystrophic conditions. Infectious signs are absent and bacteriological signs are negative. Smears show only a larger or smaller amount of eosinophilic cells. Cutaneous or intradermal reactions are positive; so also is the Prausnitz-Kutzner test for passive allergy. Adrenalin and ephedrin act immediately and temporarily, and cessation of the action of the antigen follows immediately and durably. There are two types of critical conjunctival reaction. In the first type belong reactions, perhaps indicating local sensitization since the crises occurs always at the same site. Reactions of the second type are local and alternating, but are very variable in relation to the clinical syndrome of which they form a part (asthma, urticaria, Quincke's disease, etc.), and cannot be assigned to local sensitization.

S. HANFORD MCKEE

Blepharochalis. Alvis, B. Y., *Am. J. Ophth.*, 1935, **18**: 238.

Blepharochalis, or ptosis atrophica, is a disease of the upper eyelids characterized by atrophy and relaxation of the skin and supporting tissues of the eyelids, and due to chronic or recurring œdema of the anterior orbital structure. The essential underlying cause is unknown. The first sign is painless swelling of the upper lids,

usually bilateral and symmetrical. This œdema may persist without marked diminution for years. More often the swelling recedes and recurs periodically. In the interim the skin takes on the flabby, wrinkled, discoloured appearance characteristic of the disease. The folds of skin hang loosely over the lid margins and movements of the lid may be impaired. Differential diagnosis is made from elephantiasis of the lids, lymphangioma of the lids, plexiform neurofibroma, ptosis adiposa of the aged, and Mikulicz's disease. Surgical correction of the deformity has alone been successful.

S. HANFORD MCKEE

Ocular Symptoms in Meningiomata of the Lesser Wing of the Sphenoid. David, M. and Hartmann, E., *Ann. d'Ocul.*, 1935, **172**: 177.

This paper is made up from the case reports of 26 patients suffering with the above condition. Most of them had been examined and followed in the clinic of Clovis Vincent. The diagnosis had been verified macroscopically and histologically in all the cases.

The article is divided into four parts: Introduction, Ocular Symptoms, The Course of Ocular Symptoms after Intervention, and Radiography. Ocular symptoms are again subdivided into (1) lesions of the fundus of the eye, present in 24 out of the 26 cases, that is 92 per cent; (2) visual acuity; (3) alterations in the visual field, consisting of hemianopsia in the superior quadrant, complete lateral homonymous hemianopsia, binasal hemianopsia; (4) exophthalmos; (by reason of its frequency and diagnostic value, exophthalmos occupies an important place; it was present in 40 per cent of the cases); (5) the corneal reflex; this was diminished in four cases, always on the side affected, was never seen completely absent; (6) disturbance of eye and lid movements; (7) the condition of the pupils.

Radiographic examination is an indispensable part of the investigation, and is always necessary in a case of obscure exophthalmos. Stereoscopic x-rays are frequently needed. There are 26 illustrations and an illustrative chart.

S. HANFORD MCKEE

Urology

On the Frequency of Occurrence of Occult Carcinoma of the Prostate. Rich, A. R., *J. Urol.*, 1935, **33**: 215.

With the idea in mind that carcinoma of the prostate is much more frequent than is generally realized, the writer made a detailed examination of routine sections of prostates from autopsies. Two hundred and ninety-two cases, unselected except as regards age, were studied. Forty-one cases of frank carcinoma were found in these patients who died from a great variety of causes, and in only 14 cases had the disease been recognized clinically. In many of them the tumour was so small that it was not recognized even by the pathologist with the gross specimen in his hands. Since these were routine specimens in which complete microscopic examination of the gland was not made this figure possibly does not represent the actual incidence of the disease. Though the exact location of the sections could not always be shown it was very evident that there is a decided tendency for the early tumours to be situated either laterally or posteriorly, near the capsule of the gland, which is frequently invaded before the prostate is appreciably enlarged. Benign hypertrophy was present in addition to carcinoma in 70 per cent of cases. "That cancer may arise also within the newly formed tissue of a nodule of hypertrophy there is no doubt, but the situation of the early tumours suggests that the non-hypertrophical senile tissue and the compressed atrophic glands outside the expanding nodules of hypertrophy are favourite sites of origin."

A study of symptoms revealed little because of the diversity of co-existing disease, but local pain was an early symptom, and this may well be due to early invasion of the lymph spaces surrounding the nerves about the gland capsule. Since the disease is slowly progressive and rarely appears before 50, many of those in whom it has made its appearance die of other diseases of this period before the tumour causes their death by obstruction or metastases.

N. E. BERRY

Tissue Changes in Mixed Tumours of the Kidney after Roentgen Therapy. Bothe, A. E., *J. Urol.*, 1935, **33**: 434.

In recent years there has been considerable evidence to indicate, clinically, the radiosensitivity of mixed tumours of the kidney. The author believes that the factors which deplete the degree of radiosensitivity are anæmia and cachexia, actively associated infection, overproduction of secretion, as mucin, etc. Indolent connective tissue, the result of successive inadequate treatments, adds greatly to the resistance of these tumours to x-ray.

The highly radiosensitive cell is very embryonal, poorly differentiated, and lacks a tough membrane. It is a cell rich in fluid content and does not have the tendency to form fibrous tissue. The predominating growing malignant tissue in mixed tumours of the kidney are anaplastic round cells and fairly well differentiated epithelial cells. In general, it is usually evident that the sarcomatous tissue in these tumours appears embryonal and radiosensitive, while the carcinomatous tissue appears much more radioresistant. Therefore the reduction which occurs in the size of these tumours under x-ray treatment depends on the preponderance of sarcomatous tissue.

The pathological studies on cases which have received a thorough irradiation show a preponderance of fibrous tissue and necrosis. There is also a marked reduction of vascularity and obliterating endarteritis. The author strongly advises a pre-operative irradiation of renal tumours in children with a short period of rest to build up the general condition. Cases and specimens are demonstrated.

V. J. BERRY

Neurology and Psychiatry

Research in Psychiatry. Singer, H. D., *J. Am. M. Ass.*, 1935, **104**: 2223.

Quoting the figures of Whitehorn and Zilboorg, the writer deplores the decrease in the amount of clinical research in the psychiatric field. Though extolling the great advances made from the dynamic view point, it is made very clear that even the dynamic interpretation fails to explain fully either psychosis or psychoneurosis. A paranoid attitude, an obsession, can be understood in terms of the underlying mechanisms. To explain why the individual adopts such a solution of his difficulties rather than a more healthy one, however, necessitates some additional factor, presumably a constitutional defect. This latter cannot be explained more fully at present, but is presumably dependent on some disturbance of the lower levels of integration. It is admitted that to understand the mechanisms opens up great possibilities for therapy, but to determine the underlying cause is the prime object of psychiatric research. Though seemingly a regression, the author advocates a return to the older methods of clinical observation modified in the light of more recent knowledge. The most pressing need is the devising of methods to record the responses to controlled situations, determining what functions persist and what are lost or are in abeyance in any given case. Though difficult, this is the only road which can lead to a successful classification on a truly etiological basis and through this to adequate correlation with other fields of research. To the writer the prime object of psychiatric research is to determine the factors which permit the development of an illness, regardless of the precipitating or concomitant factors.

G. N. PATERSON-SMYTH

Dermoid Tumours of the Spinal Cord. Naffziger, H. C. and Jones, O. W., Jr., *Arch. Neurol. & Psychiat.*, 1935, **33**: 941.

Intradural epidermoid and dermoid tumours arising from the conus medullaris and cauda equina are uncommon. The authors report 4 cases of this type of tumour, in only one of which was there an associated congenital bony anomaly. The long duration of the symptoms was notable in two cases — forty-two years in one instance. In two of the cases the tumour had produced definite bony alterations in the neural arch which were demonstrable by roentgen rays. Particular attention is called to a clinical test which enables one to differentiate radicular pain of intradural origin from extradural pain of radicular type. The patient is placed in a comfortable position, and when he is free from pain the cirvical veins are compressed as in the familiar Queckenstedt test. As the intracranial and intraspinal pressure above the level of a block is raised the typical radicular pain is reproduced, because the tumour or other gross lesion presumably is displaced sufficiently to cause traction on or irritation of a nerve root. Though radicular pain is more common in cases of tumour of the cauda equina, the value of the test is by no means limited to tumours of that region but is of differential value also for lesions at all levels. If the test is positive it furnishes presumptive evidence of the presence of a gross, space-consuming intradural lesion.

Another sign of diagnostic value was present in two of the four cases reported. When the needle encountered dural resistance at the time of lumbar puncture the patient experienced excruciating pain. In each instance a tumour was found anterior to the roots of the cauda equina displacing the roots posteriorly against the dura so that they were immobile and under tension. The slightest pressure on the dura irritated the immobile nerve roots, causing pain.

FRANK A. TURNBULL

Schizophrenia in One of Identical Twins. Kasasnin, J., *Arch. Neurol. & Psychiat.*, 1934, **32**: 1099.

Identical twins, at least twins who looked so much alike as to be mistaken for each other, and hence were considered to be identical by the writer of the article, were seen by Kasasnin. One had developed schizophrenia following an unsatisfactory adjustment in life; the other twin, who had managed to make a success of his business, had developed no symptoms. Eight years had elapsed since the onset of the psychosis in the first twin. This was reported to show that inheritance does not play the striking rôle in psychoses that some persons would like to believe. If it did play such a rôle, both twins, having an identical heredity, should both have developed the psychosis. In the discussion following the presentation of the case, it was brought out that there was still ample time for the other twin to develop a psychosis, and that were he examined he might not be found to be so normal as the reports of his success in business might indicate.

(While identical twins do tend to get a disease which is inherited at the same time, they need not necessarily do so, environmental conditions precipitating the disease much more

quickly in one than in the other. There is a record of identical twins who developed diabetes mellitus as long as 48 years apart, although the majority of such cases show less than two years' difference in the age of onset for the diabetes.) MADGE THURLOW MACKLIN

Therapeutics

Treatment of Angina Pectoris and Congestive Failure by Total Ablation of the Normal Thyroid. Blumgart, H. L., Riseman, J. E. F., Davis, D. and Weinstein, A. A., *Am. Heart J.*, 1935, **10**: 596.

This report summarizes the results of total thyroidectomy in 75 patients with chronic cardiovascular disease, treated at the Beth Isaac Hospital over a period of eighteen months. Prior to operation all cases, despite the use of all available medical procedures, were incapacitated because of attacks of angina pectoris, cardiac asthma, congestive failure, paroxysmal heart action or a combination of these conditions. The ages ranged from 42 to 72 years and 26 patients were over 55 years. Fifteen had hypertension, and there was a history of coronary occlusion in 14. The therapeutic benefits obtained after total ablation of the thyroid paralleled the lowering of the basal metabolism. It is noted that patients who normally have a low metabolism receive little benefit from the operation, for thyroid medication will be required to offset the untoward symptoms of myxœdema before an appreciable drop in the basal metabolism is obtained. The results in the 15 cases with hypertension demonstrate that high blood pressure is not a contraindication to the procedure. However, in no instance was the blood pressure lowered. The results in cases with coronary occlusion were slight or of a temporary nature. The authors conclude that a careful evaluation of all signs and symptoms will lead one to select cases more carefully than has been done to date, leading to a much higher percentage of satisfactory results. Their results indicate that total ablation of the thyroid deserves a definite place in the treatment of heart disease of certain types, especially arteriosclerotic heart disease. W. H. HATFIELD

A New Acid Medication in the Treatment of Bacilluria. Crance, A. M. and Maloney, T. W., *J. Urol.*, 1935, **33**: 657.

The principle of treating *B. coli* infections by the production of ketosis with suitable diet suggested this new medication. The dietary treatment is complex and difficult, and does not offer the appeal of the "bottle of medicine". The writers conclude that it is the increased acidity of the urine rather than the beta-oxybutyric acid which destroys the growth of the colon bacillus, and claim to be able to easily and effectively accomplish this with nitro-hydrochloric, U.S.P., which consists of 18 parts nitric acid to 82 parts hydrochloric. A ten minim dose of this is given in a glass of water, four times daily.

Several interesting cases of pyelitis and cystitis in which this treatment was used are reported in detail, with results so good as to make the reviewer skeptical. There was no difficulty in obtaining a pH of 5.2 or lower, the treatment is well tolerated, the urine rapidly cleared of pus, became sterile, and remained so. One case reported had been on a ketogenic diet without relief. Despite the fact that there was marked ketosis, the pH never fell below 5.6. On the acid treatment is promptly fell to 5.2, the urine cleared of pus, and became sterile. There are no contraindications to this treatment, and it may be continued for weeks with safety.

It is pointed out that, as in treatment by ketosis, the best results are obtained with the *Escherichia coli* infections. In the aerobacter type ketosis has failed absolutely, and, while the results with the acid treatment are also less encouraging, work is being done on a new plan of treatment for use in types other than the Escherichia. Fortunately, this latter type constitutes 75 per cent of all these cases. As in any type of treatment complete urological study is necessary to be certain that no pathological conditions such as calculi, strictures, etc., are present. N. E. BERRY

Pathology and Experimental Medicine

Etiological and Pathological Factors in Polycythæmia Vera. Regnikoff, P., Foot, N. C. and Bethea, J. M., *Am. J. M. Sc.*, 1933, **189**: 753.

The authors have collected and studied 134 cases of polycythæmia vera from six different hospitals. Their investigation showed that 48 per cent were Jews born in eastern Europe, although less than 10 per cent of those admitted to these institutions were of Jewish origin. They were able to obtain bone marrow sections by biopsy in five cases of polycythæmia vera, and by autopsy in two additional cases. Sixty-two other sections of bone marrow from patients with various other diseases, as leukæmia, secondary polycythæmia, agranulocytosis, Buerger's disease, etc., were used as controls.

All seven bone marrow specimens from polycythæmia vera patients showed distinct capillary thickening, probably fibrosis, and six showed, in addition, marked subintimal and adventitial fibrosis of subarterioles, capillaries, arterioles and arteries. The controls did not show these changes. The authors believe that these lesions may result in anoxæmia of the bone marrow with compensatory or excess compensatory polycythæmia. E. S. MILLS

Obituaries

Dr. William A. Ferguson, one of Moncton's most prominent physicians, died at his home in Moncton on October 2, 1935.

Dr. Ferguson was born at Richibucto on April 3, 1861, educated in the public schools there, and entered McGill in 1881. Completing his Arts and Medical Course, he graduated in 1884. His internship at the Montreal General Hospital was under Dr. F. J. Shepherd. Subsequently he was employed in the west as a medical officer for the C.P.R. on construction work, and returning east he practised in Rexton and Newcastle. After post-graduate work in New York he settled in Moncton, and there built up a practice of unusual proportions, and associated with it had the unswerving loyalty of a large number of patients. Dr. Ferguson was one of the promotors and strong supporters of the first hospital in Moncton, being senior surgeon of the Moncton City Hospital for many years, and an instructor in the Training School for Nurses. He was regional medical officer for the C.N.R. He became a Fellow of the American College of Surgeons in 1920. Dr. Ferguson was of a retiring disposition where public honours were concerned, preferring to live his own life out of the glare of publicity. He was owner of a very fine library, of which he made the greatest use.

Dr. Ferguson had been ill for some time and underwent a serious operation last July. He contracted a heavy cold a few days before his death, and died of pneumonia.

AN APPRECIATION

The death of Dr. W. A. Ferguson is a severe loss to the medical profession and community, at his home in Moncton, and to the Province of New Brunswick. He has long held a foremost position as a surgeon. He directed his energies very largely and closely to his chosen profession. He had a clear, sound and firm mind and always kept in touch with modern medical progress. His opinion carried much weight and was widely sought. He deservedly earned an outstanding place as a skilful and well informed surgeon.

We were contemporaries to an unusual degree. Born in the same town of Richibucto, Kent County, on the same day in the same year, the 30th of April, 1861, in the presence of the same obstetrician. We graduated in medicine in the same year 1884, he from McGill University, and I from Edinburgh University. Consequently I have watched his career with much interest, and it has been a great satisfaction to have observed the very successful position to which he attained. His death removes a skilful surgeon and prominent citizen from the province.

MURRAY MACLAREN

Dr. William Abraham Groves, of Fergus, Ont. Less than five months after the death of his famous father, Dr. Abraham Groves, Dr. W. A. Groves died suddenly at his home on September 26, 1935, in his 58th year. His health had not been good following a motor accident in August.

Dr. Groves graduated in medicine from the University of Toronto in 1904, and served three years overseas. On his return from the war, he was connected with the soldiers' re-establishment board and became M.O.H. for Fergus three years ago.

He is survived by one son, Dr. S. Groves, of Vancouver; and two daughters, Helen, of Toronto, and Irene, of Ridgetown.

Dr. James Edward Hanna, of Ottawa, died suddenly on August 30, 1935. He was a graduate of Queen's University, Kingston (1886) and had been retired from practice for some time. He is survived by his widow; two sons, F. J. Eric Hanna, and Dr. Herbert Hanna, of Ottawa; a daughter, Mrs. James Staveley, of Ottawa; a brother, Elijah Hanna, of Toronto; and a sister, Mrs. M. J. Willows, of Ottawa.

Dr. Andrew Henderson, of Powell River, died in St. Paul's Hospital, Vancouver, on September 19, 1935, after a brief illness. He was eighty-two years of age and had retired from practice some time ago.

A veteran of more than fifty years' practice in the West, Dr. Henderson came to British Columbia in 1909 from Calgary, where he had established an office before the C.P.R. reached the prairies.

Dr. Henderson was a native of Sorel, Que., and was educated in Montreal. After serving an apprenticeship as a druggist, he entered McGill University, graduating in medicine in 1880. Following two years as assistant and house surgeon at the Montreal General Hospital, he moved West.

In 1887 Dr. Henderson became medical director, during construction, of the western extension of the St. Paul, Minneapolis & Manitoba Railway. After completion of this contract he made his permanent residence in St. Paul, where he was in active practice. In 1909 he removed to Powell River, to become physician for the Powell River Pulp & Paper Company.

Dr. Henderson was a prominent member of the Masonic Order of British Columbia, being Grand Master of the Grand Lodge of British Columbia in 1933.

He received special honour in 1930 when fellow graduates of McGill University tendered a banquet to him at the Vancouver Club. As a tribute to his work and career he was presented with a portrait of himself, painted by Victor Long, of Vancouver.

Dr. Edward Thomas Hoidge, of Toronto, died on September 24, 1935.

Dr. Hoidge was born in 1867 and was a graduate of the University of Toronto (1902). He is survived by his wife and one daughter.

Dr. Pierre Zéphyr Rhéaume, of Montreal, died on September 18, 1935, at his residence, from a heart attack.

The death of Dr. Pierre Z. Rhéaume, Professor of Operative Surgery at the University of Montreal, and scientific director and Surgeon-in-chief at St. Luke Hospital, removes one of the most eminent French-Canadian surgeons in Canada. Dr. Rhéaume had a brilliant university record, rendered invaluable services during the Great War as director of the Canadian Medical Unit overseas, and was a generous contributor to medical and scientific journals.

Dr. Rhéaume was born at St. Urbain, Chateauguay County, 58 years ago, the son of François Rhéaume and O. Beaudin. He was educated at Montreal College and the University of Montreal, gaining his medical degree in 1900. He then went to Paris to continue in post-graduate work. On returning to Canada, he practised for a time at Valleyfield, Que. He married Marguerite Lebizay, of Brussels, in 1918, during the time he was chief surgeon of St. Cloud Hospital and of Joinville Hospital.

Dr. Rhéaume was a Member of the American College of Surgeons, a member of the Canadian Medical Association, a Fellow of the Royal College of Surgeons of Canada, Past-president of the Association des Médecins de Langue Française de l'Amerique du Nord, and President of the Montreal Surgical Society.

Dr. Rhéaume was a Knight of the Legion of Honour and a member of the Cercle Universitaire. He

went overseas with the Canadian Army Medical Corps and was attached to No. 6 Canadian General Hospital.

He was the author of "Technique Chirurgicale, Estomac et Duodenum" and many articles in Canadian, French and American medical journals. He gave numerous demonstrations in surgery while in Europe, particularly in Paris, and was held in the highest esteem by his English-speaking fellow practitioners as well as by those of his own race.

Dr. Robert Jesse Teeter, of Waterford, Ont., died on September 14, 1935. He was born in 1868, and a graduate of the Medical Faculty of Trinity University (1893).

Dr. James Allan Todd, of Toronto, died on September 19, 1935, at his home. He was in his eighty-second year and was a graduate of the University of Toronto (1879). He is survived by his widow, Florence Emily Todd.

Dr. Robert John Trimble, of Queenston, Ont., died on September 16, 1935. Following his graduation from the University of Toronto (1875), Dr. Trimble, a native of Brampton, took post-graduate work in London, England, and in Edinburgh, and was a Member of the Royal College of Surgeons, and Licentiate of the Royal College of Physicians. He began his practice in Queenston 58 years ago and was a prominent figure all through the peninsula. Mrs. Trimble died a year ago, leaving one son, Dana N. Trimble, of Buffalo, and two daughters, Misses Alice M. M. and Nannie E. S. Trimble, both of whom lived with their father. A sister, Miss Mary R. Trimble, also survives.

News Items

Alberta

For the first time in its history Alberta has been organized into District Medical Associations, whose functions will be to review the Health Activities in their areas, not only from a local standpoint but in their relationship to the whole province. Three representatives from each District Association are automatically members of the Board of Representatives of the Provincial Association, and will bring to its meetings actions and suggestions from the District. These officers will organize and assist local societies.

The Alberta Medical Association at its annual meeting adopted a new constitution, somewhat after that of the Canadian Medical Association, and by unanimous vote decided to be a Division of the Dominion organization. Under the new constitution various Committees have been appointed, to work in cooperation with the similar committees of the Canadian Medical Association, with the idea of unanimity of plan and effort. In future the Provincial Representatives on the Council of the Canadian Medical Association, will be instructed before they sit on the Council, and when they return they will report to the Board of Representatives, of which they will be *ex-officio* members. No longer will the Provincial Association have vice-presidents, but in their place will be a President-Elect whose duty will be to visit the District Associations and assist them wherever possible. Wisdom has been shown by Premier Aberhart in appointing physicians to important positions in connection with the Ministry of Health and the Workmen's Compensation Board, for the first time in the history of Alberta. First came the appointment of Dr. W. W. Cross, of Hanna, as Minister of Health, and now the appointment of Dr. V. W. Wright to the position of Commissioner and Chairman of the Workmen's Compensation Board. Dr. Victor Wallace Wright is a son of the late Dr. T. W. Wright, of Calgary. He graduated from Manitoba University in medicine in 1909 and came to Calgary in the same year, and until recently has been in active practice in that city. He has already shown a deep interest and sympathy with the problems of our physicians in connection with the Workmen's Compensation Board. We wish him every success in his new sphere of action.

G. E. LEARMONTH

British Columbia

The Greater Vancouver Health Association has issued a list of speakers, with their subjects, who are prepared to address organizations or public bodies on various health topics. The speakers include nurses, doctors, social service workers, educationists and others, dealing with a wide range of subjects. Emphasis in the present year's list is being placed upon cancer and tuberculosis. Preventive measures only are to be discussed and treatment is not dealt with except in so far as it is included in prevention.

D. E. H. CLEVELAND

Manitoba

The twenty-fifth anniversary of the founding of the Manitoba Sanatorium at Ninette was celebrated on September 14th in perfect weather. A special train conveying members of the Sanatorium Board and visitors to Ninette went out, and in addition ninety automobiles were parked on the grounds.

After luncheon and an inspection of the buildings Mr. John McEachern, Chairman of the Board for the last fourteen years, opened the proceedings. His Honour the Lieutenant-Governor paid tribute to such pioneer members of the Board as Dr. R. M. Simpson and Dr. E. W. Montgomery, both of whom were present, and to the late Dr. Gordon Bell and Dr. S. W. McInnis, of Brandon. After Dr. D. A. Stewart he mentioned the faithful services of Dr. E. L. Ross, Assistant Superintendent, and "the faithful, constant care" of the nurses. Premier John Bracken mentioned that in the twenty-five years 8,000 patients had been cared for in the sanatorium, over 4,000 of whom had been turned out cured. Each year 800 lives were saved which otherwise would have been lost. Mayor John Queen said that the fight against tuberculosis had become a winning war. Dr. R. G. Ferguson, President of the Canadian Tuberculosis Association and General Superintendent of the Saskatchewan Anti-Tuberculosis League, said three great forward movements had been made for tuberculosis patients — provision for tuberculosis patients, facilities for diagnosis, and identification of tuberculous infections in persons before they became ill. Others who spoke briefly were Mr. C. L. Stoney, President of the Union of Manitoba Municipalities, R. R. Stephenson, Reeve of Strathcona, Dr. J. D. Adamson, representing St. Boniface Sanatorium, Dr. A. B. Alexander, Superintendent of the King Edward Hospital, Winnipeg and Dr. R. M. Simpson, first Chairman of the Board and now Chairman of the Finance Committee.

Dr. D. A. Stewart said in part: "I consider myself as merely a leader who could have done nothing without such loyal services. I thank the kind friends scattered across the continent for the generous estimates they have made of the work done." Many congratulatory telegrams were received, especially one from Dr. Baldwin, head of the Trudeau Sanatorium and Trudeau Foundation for New York which contained this message: "You would seem to have reached a point in the conquest of tuberculosis in twenty-five years in Manitoba as great as many states have done in fifty years." Many other

telegrams were received from leaders both in Canada and the United States. By the kind permission of Lt.-Col. Niven, Canadian Light Infantry, the band of the Princess Patricias enlivened the proceedings.

Over one hundred doctors were present at the Manitoba Sanatorium at Ninette on October 2nd to celebrate the twenty-fifth anniversary of its founding. Dr. D. A. Stewart, the Superintendent of the institution from its inception was presented with a piece of plate by the doctors who had served under him during that time.

ROSS MITCHELL

New Brunswick

The New Brunswick Department of Health, under the leadership of Hon. Dr. W. F. Roberts, has begun a serious campaign for the education of the public concerning cancer. Speaking at the meeting of the New Brunswick Hospital Association, Dr. Roberts drew special attention to the dangers of the treatment of cancer by quacks, especially that type of irregular practitioner who for years has made use of a variety of arsenical plasters or pastes. Dr. Roberts pointed out the Cancer Clinic had been functioning in the Saint John General Hospital for some years, organized on the most up-to-date lines, and having available the services of all necessary specialists. He pointed out that as soon as possible a sufficient quantity of radium will be provided by the Government for the treatment of indigent cancer patients.

A most welcome donation was recently received by the Saint John General Hospital from Mrs. Hetherington, of Cody's, Queens County. This donation, amounting to $3,000.00, was a gift in memory of Mrs. Hetherington's late husband, Hon. Dr. Judson E. Hetherington. The gift was ear-marked for use by the hospital in its medical library.

The creation of a fifth Health District in New Brunswick is forecast in the new regulations promulgated by the Minister of Health. This district will include the counties of York and Sunbury.

Recent provincial appointments include the names of Dr. A. T. Leatherbarrow, Hampton, and Dr. W. H. White, Sussex, as coroners.

Quite recently a small group of 7 cases of typhoid has been reported in Saint John. By some rather clever detective work on the part of the public health authorities this outbreak has been traced to a natural spring in one of the playing fields of the City.

The New Brunswick Hospital Association at its meeting in September, went on record in support of a definite Provincial Government subsidy to hospitals on a per diem basis instead of the small lump sum at present in force.

At the meeting of the Union of New Brunswick Municipalities, a resolution was passed urging the inclusion of medical aid, to be paid for under Governmental relief schemes.

Dr. S. R. D. Hewitt, Superintendent of the Saint John General Hospital, made an address on "Group Hospitalization" at the session of the New Brunswick Hospital Association. This is a scheme which in Dr. Hewitt's opinion should be a valuable one in many communities throughout the country.

Hon. Dr. W. F. Roberts, Minister of Health and Labour, was elected Honorary President of the New Brunswick Hospital Association recently.

Dr. C. J. Veniot, Mayor of Bathurst, has been elected president of the New Brunswick Union of Municipalities.

Dr. A. Douglas Gibbon has commenced practice of medicine in Saint John.

Dr. J. H. W. Rice has opened an office in Campbellton.

A. STANLEY KIRKLAND

Nova Scotia

Interesting figures were quoted by Hon. Dr. F. R. Davis, Minister of Health for Nova Scotia, at the annual convention of the union of Nova Scotian municipalities held at Amherst. The sum spent on patent medicines amounted to two and one-half million dollars per year. The significant statement (not emphasized often enough) was made that some of these medicines were useless—perhaps most of them—and that some probably were harmful. The sum of eleven million dollars was spent in the treatment of disease. This puts even greater emphasis on the big sum spent on patent remedies. It was estimated that there were 2,500 cases of tuberculosis, but that hospitalization for all was out of the question for economic reasons. The Government, however, was lending aid to hospitals in the construction of tuberculosis annexes in certain localities. Further, the Government was offering certain laboratory facilities not previously available to the municipalities.

The tuberculosis survey of the towns of Glace Bay and Dominion and the municipality of Reserve Mines has been completed. This survey was sponsored by the Provincial Government, and was carried out under the supervision of Doctors Grant and McLean of Dalhousie University. The local branch of the Canadian Legion assisted considerably in carrying out this work, providing cars for transporting the staff engaged as well as some of those undergoing the test.

Dr. Kenneth Grant, recently returned from Chicago where he spent considerable time in post-graduate work in Obstetrics and Gynæcology, has been appointed to the staff of the Public Health Clinic in Halifax.

N. B. DREYER

Ontario

The annual meeting of District Number One of the Ontario Medical Association will be held in London on November 13th. The annual meetings of all the other Districts, with the exception of District Number Eleven, have now been held.

Refresher courses have been put on at the University of Western Ontario, the University of Toronto, and Queen's University. Some seventy-five physicians of Western Ontario attended the refresher course there during the week of September 29th. Everyone was appreciative of the clinics and lectures and expressed the hope that the course would be repeated next year.

Dr. Ernie Appleyard, of Seaforth, a 1930 graduate of the University of Western Ontario, has recently secured his M.R.C.P.(London).

The Honourable Dr. J. A. Faulkner, Minister of Health for Ontario, has announced that no more radium will be purchased by the Government at the present time, and no additional radium clinics will be opened. It is hoped that the research now being con-

ducted by Dr. H. C. Connell, of Kingston, may lead to a better and cheaper treatment of cancer. The Honourable Dr. Faulkner has announced that he is giving Dr. Connell access to the Ontario Hospitals and has directed that any patient in the Mental Hospitals suffering from cancer shall be turned over to Dr. Connell after consent has been secured from the next of kin.

Dr. G. J. Wherrett, Executive Secretary of the Canadian Tuberculosis Association, recently visited the new Thunder Bay District Sanatorium at Fort William, and expressed himself as very much pleased with the Sanatorium, which is of the most modern type. The province has been divided into areas to which clinics will be sent to hold examinations of tuberculosis contacts.

An eight-hour day of duty for nurses has recently gone into effect at Grace Hospital, Windsor. In establishing the eight-hour day, Grace Hospital will take the lead among the Windsor hospitals, and will be among the first half dozen hospitals in Ontario to adopt the system. There will be three eight-hour shifts—from 7.00 a.m. to 3.00 p.m., from 3.00 p.m. to 11.00 p.m., and from 11.00 p.m. to 7.00 a.m. The number of student nurses on the staff has been increased from 40 to 58 in order to facilitate the new system.

J. H. ELLIOTT

Quebec

At a meeting of the Senate of McGill University, held on September 18th, congratulations were sent to Dr. Griffith Evans, of Bangor, Wales, on the occasion of the attainment of his hundredth birthday. The following resolution was transmitted to Doctor Evans.

"It was with very special pride that McGill University, of which Dr. Griffith Evans has become such a distinguished graduate, recognizes his achievements in medical science, accomplishments which have had such a fundamental bearing on the diagnosis and treatment of many diseases, and which have been of such inestimable benefit to mankind."

Saskatchewan

The Department of Indian Affairs has begun the contruction of a $100,000 hospital at Fort Qu'Appelle. The first sod was turned on September 4th. Dr. A. B. Simes, Medical Superintendent, Qu'Appelle Indian Health Unit, Dr. C. Hall, Fort Qu'Appelle, and local municipal officers were present at the ceremony; the Sioux Indians were also represented. The hospital which is T-shaped will provide 50 beds, with a basement, and will be two full storeys in height. It will be fireproof and thoroughly modern.

General

IN HONOUR OF THE DOG.—Honouring the dog, so often the hero and invaluable aid of medical research, a bronze monument will be erected on the grounds of the All-Union Institute of Experimental Medicine at Leningrad.

The Monument to the Dog, as it is to be called, will be erected at the suggestion of Academician I. Pavlov, whose famous discoveries in physiology were made by means of studies with dogs. The monument is to be a bronze image of a sitting dog on a pedestal. Bas-reliefs on all four sides of the pedestal will depict separate moments from the life of the dog at Pavlov's laboratory.—*Science News Letter*, September 7, 1935.

Book Reviews

The Pathology of Internal Diseases. William Boyd, M.D., M.R.C.P.(Edin.), F.R.C.P.(Lond.), Dipl. Psych., F.R.S.(C), Professor of Pathology, University of Manitoba, etc. Second edition. 904 pages, illustrated. Price, $10.00. Lea and Febiger, Philadelphia, 1935.

The first edition of this work was reviewed at length in this *Journal* in February, 1931. The favourable impression conveyed at that time is now renewed and even enhanced. The second edition is conceived on similar lines to the first, but is more complete, and, of course, up to date. The spirit of Morgagni pervades the work, for, in all cases, the pathological lesions of disease are linked up with the clinical features. The author has adhered to his original purpose, which was to produce "an illustrated text-book of internal medicine, written from the point of view, not of diagnosis or of cure, but of the mechanism of disease, its why and its wherefore". The book is not over-weighted with anatomical and histological detail, but stress is laid on the etiology and pathogenesis of disease and the clinical applications. Thus the reader gets a sort of bird's eye view of each subject, but, withal, a clean-cut, logical, picture which is most helpful. Professor Boyd is a born teacher and presents his many topics in plain and concise terms. He gives various theories, but he dissects them, and then gives his own opinions. The result is that the reader gets an excellent and trustworthy account of disease on which he can base a rational practice. Much new matter has been added in this edition, and major alterations have been made in the sections on the anæmias, diseases of the pituitary body, parathyroid tumours, amaurotic family idiocy, tumours of the pleura, status lymphaticus, pneumonokoniosis, cirrhosis of the liver, the bacteriology of influenza, agranulocytic angina, peptic ulcer, bronchiectasis and jaundice. The historical features of the first edition have been continued and somewhat elaborated. The references are arranged under subject headings instead of alphabetically, a decided improvement. It is hard to speak of this book in restrained terms. It is positively splendid. It is easily the best work extant on clinical pathology.

The Cyclopædia of Medicine. George Morris Piersol, Editor-in-Chief. Vols. VIII to XII. Price (twelve volumes) $120.00. Davis, Philadelphia, 1933-34.

In the December issue of the *Journal* for 1933 we published a comprehensive review of this monumental work, based on the earlier volumes. The work is now completed and, we may say at once, has completely fulfilled its earlier promise. It is, undoubtedly, the best work of its kind in the language. The task of the reviewer is difficult, for it is impossible to read carefully and thoroughly a work of such wide scope and detailed statement. It is difficult also for the reason that there is so much of interest to rivet one's attention. One is being continually "held up", so to speak. Some of the articles, for example, those on Pregnancy, Parturition, and the Puerperium, and that on Radiology, are veritable text-books on these subjects. Striking articles (only a few out of many) are those on the Interpretation of Radiograms, Endocrinology, Exercise, Metabolism, Plastic Surgery, and Psychoses and Psychoanalysis. The illustrations for the most part are very fine. Each volume has a very complete and helpful index, and a special feature is the index provided for the whole work. This is so conceived and the subject headings are so printed that it is easy for any one to find quickly the kind of information he is looking for. The topics of the greatest practical interest are printed in bold-faced type, which makes for ready reference. The index is in a loose binder, and the publishers intend to issue a new index with every annual supplement to the work.

We can only repeat our former commendation. The Cyclopædia of Medicine is a library in itself and should meet almost every need. It is difficult to conceive of anything better, especially for the practitioner who is remote from the large centres of medical thought.

A Manual of Obstetrical and Gynæcological Pathology. John H. Teacher, M.D. 407 pages, illustrated. Price $13.50. Oxford University Press, London; McAinsh, Toronto, 1935.

This is a book of four hundred pages, divided into nineteen chapters. It is illustrated by two excellent coloured plates and 316 text figures, chiefly microphotographs of good quality. The book was planned by the late Professor Teacher, and nine of the chapters, dealing with the endometrium and its diseases, are from his pen. After his death the task of completing the work was undertaken by Dr. Alice Marshall, who secured the collaboration of Drs. Robert Cruickshank, James Hendry, Elinor D. Jackson Rutherford, Wm. Fletcher Shaw, Matthew J. Stewart and Gilbert I. Strachan. Each member of the group is to be congratulated upon his contribution to the volume. The book presents in compact and readable form a summary of modern knowledge of pathological changes in the female genital organs. It should prove particularly useful to the teacher of gynæcology.

Diseases of the Thyroid Gland. Arthur E. Hertzler, M.D., Chief Surgeon, Halstead Hospital, University of Kansas. Third edition, 348 pages, illustrated. Price $8.50. C. V. Mosby, St. Louis; McAinsh & Co., Toronto, 1935.

The first edition of this work appeared in 1922, the second in 1929. Considerable text has been added and a number of illustrations, all of which are of excellent quality. The author has followed many patients over a long period of years and writes from close observation. He is convinced of the value of more radical operations and finds no myxœdema following complete thyroidectomy. He considers the basal metabolic readings only one factor, and a minor one, in the study of thyroid disease, and the acceptance of this test as a measure of all the michief the disease may do the patient responsible for most of our misconceptions regarding the nature of goitre. Two hundred and fifty pages are devoted to the various forms of goitre in the child and adult, to tumours, inflammation, functional disturbances and effects upon the heart. Some fifty pages deal with topographical anatomy and technique of operations. The chapter on hospital management, pre-operative and post-operative, is well written.

The author is to be congratulated upon the new edition and the publishers have done their work well.

The Kidney in Health and Disease. Edited by Hilding Berglund, M.D. and others. 754 pages, illustrated. Price $10.00. Lea & Febiger, Philadelphia, 1935.

This volume is the outgrowth of a symposium on the structure and function of the kidney in health and disease which took place in Minneapolis during the summer of 1930. The list of contributors includes the names of 41 men, from the United States, Canada and the Continent, famed for their contributions to the problems relating to the kidney. Collectively, they present a comprehensive and authoritative exposition of our present knowledge of the kidney.

The text is divided into five parts. The first 162 pages are devoted to the Anatomy and Physiology. Of the nine chapters, that by Richards, on Urine Formation in the Amphibian Kidney, and Rehberg, The Filtration Reabsorption Theory of Kidney Function and Its Use in the Clinic, are outstanding. One hundred pages correlate the clinical aspects of renal functions. Bright's Disease and Various other Pathological Renal Conditions occupies another 162 pages. The contributions of Bell, Reiman and Longcope are of especial interest. Part IV., Albuminuria and Œdema, includes clinical and experimental studies. Ocular Changes in Bright's Disease are comprehensively described and illustrated in part V. The Clinical Aspects of Bright's Disease, two of the six chapters being written by Frans Volhard, constitutes the final part.

The contents of this book certainly justify the claims of the publishers. The material is well organized, with very little overlapping. At the end of each chapter is a full bibliography of the subject matter under discussion. The volume contains numerous charts, and tables and is illustrated with 163 engravings. It creates an excellent reference for the senior student and every internist, and offers the general practitioner an opportunity to follow the modern trends and results of the later research and its clinical application.

A Textbook of Fractures and Dislocations. Kellogg Speed, S.B., M.D., F.A.C.S., Professor of Clinical Surgery, Rush Medical College, University of Chicago. Third edition, 1,000 pages, illustrated. Price $11.00. Lea & Febiger, Philadelphia, 1935.

A correspondent in this *Journal* recently inquired if a good one-volume treatise on fractures existed. Any well-read surgeon could have answered him and "Fractures and dislocations" by Kellogg Speed would have been named early in the list recommended. A third edition of this work has recently come from the press of Lea and Febiger. It is a well indexed and profusely illustrated volume. The text was written by the author without collaboration, but it does not expound a new doctrine of treatment, nor does it condemn or extol any particular method. The book is a sane discussion of the pathology and mechanism of fractures or dislocations occurring anywhere in the body, with a preferred treatment in each instance. The ancient principle of reduction by manipulation followed by fixation in splints is applied as far as any conservative surgeon can reasonably expect. The use of circular incasement in plaster of paris as a primary splint is deplored, unless the case is under constant supervision in a hospital. The principle of traction is evidently a favourite with the author and the methods of its application are characterized by simplicity. The advantages and disadvantages of operative reductions with internal splinting are dispassionately cited, and the imperative indications for the method are clearly stated.

The author has drawn practically all his conclusions from his own experience, which is remarkably extensive, but he does not limit himself. For example, in discussing fractures of the carpal scaphoid he quotes Murray, of Toronto, and illustrates the latter's method of fixation by a dowel of fresh bone. The work is comprehensive, advocates no fad, and should give adequate guidance to the practitioner who must assume the management of a fracture or dislocation.

Essays on Chronic and Familial Syphilis. Griffith Evans, M.A., D.M., F.R.C.S., Honorary Surgeon, Caernarvonshire and Anglesey Infirmary. 91 pages. Price $2.50. John Wright & Sons, Bristol, 1934.

This recent monograph by Evans presents a very unusual departure from conventional standards in the diagnosis and treatment of some of the rarer manifestations of syphilis. Chapters are devoted to chronic syphilis, syphilis and nervous dyspepsia, endo-syphilis and the chronic abdomen, abdominal adhesions, the Plummer-Vinson syndrome, certain types of tongue lesions and their relation to syphilis, and cancer and syphilis. It is unfortunate that such a discussion is not on a firmer factual basis. Many more or less nebulous hypotheses are accepted as proved and are used to confirm illustrative cases. This might be

excused were it not for many obvious misstatements and inaccuracies. At the onset the author assumes that the *Treponema pallidum* passes through a granular virus stage. This controversial question, largely studied by Levaditi and his co-workers, has never been settled, and the recent work of Besseman *et al.* has again cast doubt on much of the earlier material. A little later on the author states, "If the disease is acquired from a latent case, no chancre or exanthems, only chronic proliferating lesions, occur." Here again is a highly controversial statement. He later states, "Spirochæta and host reach a stage of symbiosis, and enjoy good health, as if they were protected from intercurrent infection." On page 15 the statement is made that spirochætes are rarely demonstrated, and, while this statement is merely an exaggeration of the facts, it should not be made for consumption by students or general practitioners, since the newer techniques are becoming increasingly reliable. To ascribe various forms of glossitis, as well as Plummer-Vinson syndrome, to syphilis is also in the realm of speculation and improbability. For example, one case was quoted as occurring in the granddaughter of a syphilitic, but though third generation syphilis does occur it is one of Nature's rarities. None of the above statements, however, are so dangerous as the following— "It is probably unwise to treat latent syphilis if symptoms are absent". Perhaps the author forgets that it is from this great group that all cardio-vascular syphilis, the most killing form of the disease today, is recruited. In any event, the book is only suitable for the perusal of the experienced syphilologist, as an expression of the author's personal opinion.

Recording of Local Health Work. W. F. Walker, Dr.P.H., and Caroline R. Randolph; Division of Health Studies, The Commonwealth Fund. 275 pages. Price $2.00. The Commonwealth Fund, New York City, 1935.

Every physician, whether it be in connection with his own practice or in his hospital work, is appreciative of the value of adequate records. The medical officer of health is dependent upon records for knowledge of conditions in his area and of the service given by his staff. Efficiency, effectiveness and economy demand good records. What has been accomplished in this publication is to present to the responsible public health authorities a system of record-keeping. The work marks an achievement in Public Health which is comparable to the first publications on standard methods for water and milk analyses, or of the appraisal forms for public health work.

The volume is a credit to the printer, and it is obvious that the sale price cannot meet the costs of publication. The full size of the specimen forms and the clear explanations as to their use are most satisfactory. The thanks of all public health workers will be extended to Doctor Walker and Miss Randolph for their very excellent and worth-while publication.

The Woman Asks the Doctor. Emil Novak, M.D., F.A.C.S., Honorary D.Sc.,(Dublin), Associate in Gynæcology, Johns Hopkins Medical School. 190 pages. Price $1.50. Williams & Wilkins Co., Baltimore, 1935.

This is a very interesting and useful book, printed in good type. It is not a text-book. Its purpose is to provide a clear answer to the common questions which women ask, or which they want to ask. Starting with the question as to why women are what they are, Doctor Novak proceeds to consider menstruation, dealing, first of all, with the superstitions which surround this function, then presenting a simple, but satisfying explanation of the female reproductive system, which leads, in turn, to the cause and significance of menstruation.

A chapter is devoted to glands and their relationship to female functions; this is a very restrained and conservative presentation, which concludes "gland treatment is not quite as simple and as satisfactory as women sometimes think." Disorders of menstruation are adequately dealt with, and the chapter on the menopause is particularly well done. A brief description of "rhythm" is included.

This is a valuable and instructive book which physicians may well read to their own profit, while considering its rôle in the education of their patients. Many women feel diffident about asking questions even of their family doctor. This book will help women through giving them an understanding of the female body and its functions. It is recommended to the medical profession.

Problems of Anæsthesia in General Practice. D. H. Lukis, M.D., B.S., Late Hon. Anæsthetist, S. London Hospital. 151 pages. Price 7/6d. net. Hodder & Stoughton, London, 1935.

This little treatise is an essay which was awarded the Sir Charles Hastings Prize of the British Medical Association, 1934. As its title implies, it seeks to deal with the problems of anæsthesia as encountered by the general practitioner. The real problem, as the author points out early in his book, is that the general practitioner may not give an anæsthetic for weeks on end and then be called upon to give a series. Consequently he cannot be expected to approach the skill in administration of the specialist in anæsthesia; and the technique employed must not be too involved. The relative advantages and disadvantages of the various anæsthetic agents are considered in turn, and the author concludes with a strong plea for chloroform. The scope of administration of anæsthetics by the general practitioner is carefully indicated and sound advice given as to when to call in the specialist in anæsthesia. This volume, which includes the technique of administering the various anæsthetic agents, as well as several illuminating statistical charts collected from the author's series of 5,138 administrations, is recommended as a valuable addition to the general practitioner's library and will not be without interest and profit to the specialist in anæsthesia.

Respiration. J. S. Haldane, C.H., M.D., F.R.S., Hon. Professor, Birmingham University, and J. G. Priestley, M.C., D.M., M.A., Reader in Clinical Physiology, University of Oxford. Second edition, 493 pages. Price 30s. net. Oxford University Press, London, 1935.

It is nearly fifteen years since the preceding edition of this book (the first). There is therefore a great deal of revision and bringing up to date, which has been done most thoroughly.

It is not only as a collection of facts on respiration that Dr. Haldane's book is notable but also in its method of approach to the subject. The physiology of respiration deals, he says, with phenomena which are specifically those of life. A mere description and analysis of all the chemical and physical processes by which oxygen is supplied to the living body and CO_2 removed is incomplete, no matter how comprehensive it may be, for these processes are coordinated at every stage among themselves and with other physiological activities, and the structures carrying out the processes are developed and maintained characteristically. It is impossible to explain this coordination, development, and maintenance except in terms of life, and life is not to be explained in chemical or physical terms. But we may make use of physical and chemical interpretations of the phenomena of life, superficial as these may be, for they still do not take account of the coordination of the phenomena. This is the point of view of the book; it is a philosophical one and is refreshing in the extreme.

The opening chapters, including a historical introduction of great interest, deal with the Regulation of

Breathing, the Blood as a carrier of CO_2, and the Nervous Control of Breathing. The author then passes on to various aspects of oxygen in respiration, the effects and causes of anoxæmia, and the secretion of O in the lungs. Two chapters are devoted to effects of low and high atmospheric pressures. As Dr. Haldane does not allow his physiology to be divided up into water tight compartments, he includes a chapter on Blood Circulation and Breathing, and there is finally an extremely interesting chapter on the various impurities that may occur in an atmosphere.

Clinical Laboratory Methods and Diagnosis. R. B. H. Gradwohl, M.D., Director of Gradwohl Laboratories. 1028 pages, illustrated. Price $9.50. C. V. Mosby Co., St. Louis; McAinsh & Co., Toronto, 1935.

The writer of this volume is well and favourably known as the senior author of "Blood and Urine Chemistry", and as the translator of Schilling's book "The Blood Picture". In this work he offers in eighteen chapters a complete account of clinical laboratory methods. Technical procedures are described fully and clearly, and the book is something more than a manual of laboratory technique, as the clinical applications of the various tests and the interpretation of results are discussed at great length.

The scope of the book is indicated in the table of contents: General Considerations; Urine Analysis; Blood Chemistry; Hæmatology; Gastric Analysis; Examination of Puncture Fluids; Examination of Sputum; Special Tests; Fæces; Parasitology and Exotic Pathology; Bacteriological Applications to Clinical Diagnosis; Serology; Basal Metabolism; Post-mortem Examinations; Tissue Cutting and Staining; Preparation of Museum Specimens; Toxicological Technique; Minimum Supplies; Equipment and Reagents for Pathological Laboratories.

The chapter headed "Special Tests" is devoted to Rabies, Laboratory Tests for Pregnancy, Hypersensitiveness, Atopy, Chemical Milk Analysis, Mycological Diagnosis, Autogenous Vaccines, Semen Appraisal. Special attention is devoted to Hæmatology, and Schilling's theories and methods are favoured. The book is profusely illustrated. The coloured plates of the blood cells are excellent and the microphotographs are of good quality.

Dr. Gradwohl is to be congratulated on producing an excellent reference book for laboratory workers. The discriminating reader will, however, find something to criticize in the author's style, as well as in the proof reading.

Economic Problems of Medicine. A. C. Christie, M.S., M.D., Professor of Clinical Radiology, Georgetown University Medical School. 242 pages. Price $2.40. Macmillan Co., New York and Toronto, 1935.

The author has been active in the field of medical economics, and attempts here to present a concise summary of the subject from the viewpoint of the private practitioner. It is recognized that "the practice of medicine is no longer the simple matter of twenty-five or thirty years ago", and that "the complex changes in modern society and industry are rendering it increasingly difficult to give medical care to all the people at prices they can afford to pay". In Doctor Christie's opinion, the solution of the problem is a responsibility of the physician.

A chapter is devoted to "Economic Aspects of Medical Education", which culminates in a section on the education of specialists, which, when it is attained, will in the author's opinion solve one of the problems attending the costs of medical care by "the elimination of waste due to inefficiency". The sections which follow on private practice, the hospital, etc., are, on the whole, fair presentations. There is, almost of necessity, by reason of the limits of space, the occasional statement for which it would be desirable to have support or reasons given, such as: "It is not practical nor (sic) desirable for the full-time physicians of the health department to undertake this work" (diphtheria immunization). It may be a matter of opinion as to the desirability of their doing so, but many communities have proved the practicability of the measure. Also a statement "The control and elimination of venereal disease is almost wholly his (family doctor's) responsibility" is open to question. However, these are minor points.

A review of a number of plans now in operation is of real value. The plan of the Committee on Economics of the Canadian Medical Association is cited with one caustic comment: "The conclusion of the first part of the report is an attempt to answer, rather inadequately be it said, the adverse criticisms that have been made of health insurance systems."

Towards the end of the book, we find a sub-heading, "Is Health Insurance the Solution?" Doctor Christie writes that there are "facts which may be considered settled", and under this, "(1) Contrary to original beliefs, health insurance has not shown any appreciable influence in the prevention of disease or in decreasing the mortality rate." To say that such a statement is an accepted fact, in view of the expressed opinions of such authorities as Sir George Newman, is ridiculous.

The conclusion is that some changes are necessary, but "that the best line of progress for the public and the profession lies in careful and patient modification of the system which has been established by centuries of experience. That group practice and insurance have some place in such progress there seems no doubt."

The book is recommended to the profession and will be of particular interest as a presentation from one who signed the minority report of The Committee on the Costs of Medical Care.

Clinical Parasitology and Tropical Medicine. Damaso de Rivas, B.Sc.Biol., M.D., Ph.D., Professor of Parasitology, Graduate School of Medicine, University of Pennsylvania, and Carlos T. de Rivas, M.D., Pathologist to the Santo Thomas Hospital, Panama. 367 pages, illustrated. Price $5.00. Lea & Febiger, Phila., 1935.

The authors' introduction gives a general review of historical and biological discussions and classifications of protozoa and metozoa. In the chapter on the etiology and pathology of parasitic affections the authors cite very interesting clinical observations on the psychic effect of parasitic infestation. In the same chapter a review of the clinical and laboratory methods of diagnosis and treatment is given. The value of the de Rivas concentration method of diagnosis and the de Rivas intraintestinal thermal method of treatment is specially stressed.

In the succeeding chapters is presented a well written account on the tropical diseases caused by protozoa, metazoa, bacteria, and those of undetermined etiology, under the headings of etiology, pathology, symptoms, diagnosis, prevention and treatment. A discussion of climatic diseases and animal poisons ends the volume.

It is to be regretted that the authors have omitted all mention of mycotic diseases, which are very common. If this omission is due to the desire for brevity, it would have added materially to the value of the book to have replaced the chapter on animal poisons by one on mycotic diseases.

The volume has 145 illustrations, including a coloured plate, which, along with 66 of the illustrations, were taken from the de "Rivas Parasitology", from which also many of the charts and discussions are taken.

Even though the book shows occasional carelessness in the proof reading, on the whole it is well presented, up to date, and should prove a valuable aid to the medical student and practitioner.

A Textbook of Laboratory Diagnosis. Edwin E. Osgood, M.A., M.D., Assistant Professor of Medicine and Biochemistry, University of Oregon. Second edition, 585 pages, illustrated. Price $6.00. Blakiston's Son, Phila., 1935.

This, the second edition of a well known and deservedly popular work, is dedicated to the memory of Howard D. Haskins, who was co-author of the first edition. The fundamental plan of the work is unchanged, but the text has been extensively revised and much new material has been added. Among the major additions are an account of the urea-clearance test, the insulin coefficient, the Friedman pregnancy test, the galactose-tolerance test, and the forensic aspects of blood grouping. A complete description of the author's hæmatological methods is included. Special attention has been given to new developments in diagnosis by laboratory means.

This book, written by one who is a recognized authority on his subject and an enthusiastic teacher, will prove a valuable addition to the library of the internist or laboratory worker.

The Medicine Man of the American Indian and his Cultural Background. William T. Corlett, M.D., L.R.C.P., Professor-Emeritus of Dermatology-Syphilology, Western Reserve University, etc. 369 pages, illustrated. Price $5.00. C. Thomas, Springfield, Ill., 1935.

The object of the author of this captivating work is to supply a fuller account of medical thought and practice among the Indians of America. To do this effectively, he has found it necessary to increase the scope of his enquiry to include a study of the Indian's method of procedure, personality and cultural standards. The interest of all this is obvious, and Doctor Corlett has done well to record so much of the medical and folk-lore of the Indian while it is still possible to get accurate information. Even though many of the Indian tribes are maintaining their numbers, or perhaps increasing them, with the spread of the civilization of the white peoples with whom they come in contact it is inevitable that the links with the historical and ethnological past will in the no distant future be broken. We are glad, therefore, to have an authenticated record.

Doctor Corlett's treatment of his subject is on broad lines. He deals with the Indian tribes seriatim, beginning with the Arctic regions and ending with Patagonia. He first considers the racial origin of the American Indian and the populating of the New World; he discusses the diseases that affect the Indian, the Medicine-Man, and Religion. He then passes on to the more detailed account of the Medicine-Man in North, Central and South America. The rest of the book is concerned with the subjects of childbearing, foods, and materia medica, and it ends with the American Indian's Recessional. It is surprising what an amount of information is conveyed in these pages, conveyed, too, in a most pleasing way. Those of us who are interested in Indians—and who is not—will find in this book a rare treat.

A Treatise on Medical Jurisprudence. Benton S. Oppenheimer, LL.B., LL.M., Professor of Law and Professor of Medical Jurisprudence, University of Cincinnati. XI and 290 pages. Price $4.00. William Wood, Baltimore, 1935.

This is a helpful book. It is the outcome and elaboration of a half dozen brief symposia on the subject held in the College of Medicine with which the author is connected, and is designed to be of assistance to physicians, lawyers, nurses, and social workers who are occasionally confronted with medico-legal problems. Such a work was needed, for the average lawyer is almost helpless when he has to disentangle an intricate medical case, and on account of his ignorance of medical subjects may be quite unable to lay bare the truth; similarly, physicians are, as a rule, unaware of the legal implications of certain of their acts until rudely awakened to a sense of their reality. Professor Oppenheimer, after a short historical disquisition on the development of medical training and the regulation of the practice of medicine in England and the United States, passes on to discuss such subjects as the relation between doctor and patient, the duties and obligations of the physician to the patient, malpractice, contributory negligence of patients, evidence, expert testimony, hypothetical questions, privilege, the legal position of private and public hospitals, the ownership of x-ray films, the admissibility of records in evidence, dying declarations, the physician's right to compensation, the right to perform autopsies without permission, the coroner. Doubtless, with the rapidly changing aspect of medical practice, particularly with regard to what is commonly known as "state medicine" new medico-legal problems will arise and the old ones will be presented in a new guise, but the list of topics considered in this work is for the present sufficiently broad. While most of the cases cited are taken from United States courts, the problems presented are discussed pro and con and the general principles governing them, which, after all, are fairly well crystallized in English-speaking countries, are clearly stated, so that Professor Oppenheimer's book may be read with profit by those in England and Canada. The book is commended to our readers, as physicians are well advised to acquaint themselves with the legal consequences of their acts, for, thereby, they may save themselves much trouble and expense. Here, at least, a little knowledge is *not* a dangerous thing.

Infections of the Urinary Tract. T. E. Hammond, F.R.C.S., Surgeon, The Royal Infirmary, Cardiff. 250 pages. Price 10/6 net. H. K. Lewis, London, 1935.

The writer of this book is apparently a general surgeon who has had considerable urological experience. In the introduction he states that "this book should be regarded as a series of talks to practitioners by the bedside of the patient . . . and is not intended as a complete treatise on urinary infections." Save for three unimportant diagrams and three temperature charts the book is not illustrated. The style is rather discursive, with much repetition and the inclusion of extraneous matters only slightly related to the subject. The author's conception of the influence of acquired and inherited constitutional states upon the resistance to bacterial infections is discussed at length. Patients are classified as being of the hypersthenic or hyposthenic types and also there are those who have the "bilious diathesis" and are therefore peculiarly susceptible to infection by *B. coli*. This is carried so far that in the treatment of gonorrhœa an hypersthenic patient is given urethral injections of potassium permanganate solution, while the hyposthenic receives zinc permanganate, and in the use of alkalies in gonorrhœa and in pyelitis due to the *B. coli* potassium salts are used in the hypersthenic and sodium in the hyposthenic. With the passage of the years the writer has become more and more conservative in treatment, but surely this has been carried too far when he fears to incise a perineal or prostatic abscess lest the infection spread because the overlying tissues are opened up by the operation. He swings far in the other direction when he states that "suprapubic cystotomy is the treatment of choice" for acute retention due to prostatic abscess. He immediately admits, however, that this may be "rather drastic" as the inflammation may subside in a day or two. The ketogenic diet is very briefly mentioned, with no details as to its use and apparently little belief in its value. In the section on staphylococcic infections no mention

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is made of carbuncle of the kidney. If this work has value it lies in its plea for a more careful study of the patient as a whole, of his constitutional resistance to disease, and of measures to stimulate resistance and to raise his morale.

Diseases of the Liver, Gall-bladder, Ducts and Pancreas. Samuel Weiss, M.D., F.A.C.P., Clinical Professor of Gastroenterology, Jewish Memorial and Beth David Hospitals, N.Y. 1099 pages, illustrated. Price $10.00. Paul B. Hoeber, New York, 1935.

In this large volume of over one thousand rather closely printed pages the author has undertaken to place before the student and general practitioner facts which will aid them in their daily contact with patients, and to help them to arrive at a correct diagnosis and choose a rational treatment. There is no doubt that such a work is needed and will be welcomed, as since the edition of Rolleston's treatise revised in 1929 by McNee there has been no comprehensive presentation of the widely diversified but intimately related manifestations of this group of diseases; many valuable contributions published in monographs and in current medical literature are not generally available when wanted, but will be found described in this work.

Sixty pages are devoted to the methods of indirect examination of the liver but the writer begins by pointing out that no single test has yet been devised that will accurately indicate which function is most seriously disturbed or to what extent the liver has actually been damaged, due to the enormous margin of safety which the liver possesses and its power of regeneration. Upwards of thirty different tests of liver function are described but out of these only the well-known and standard ones, *viz.*, the Levulose and Galactose Tolerance tests, the Icterus Index, the Cholesterol test, the Urobilin and Urobilinogen estimation and the Van den Bergh test are considered as affording useful and dependable information. The question of the danger of toxic reaction from the administration of phthalein compounds is mentioned as not definitely settled. The Rose Bengal test is held to be of value in differentiating between cirrhosis and other causes of ascites. Non-surgical drainage of the biliary tract is fully treated in a separate chapter and its value both in diagnosis is emphasized with the caution that it should form only a part of the program of care.

Most physicians of extensive experience will welcome the author's acceptance of the diagnosis of "biliousness" or "torpid liver"; even the popular English complaint of a "Chill on the Liver" may be admitted as existing. The symptoms are narrated as malaise, some hepatic pain, headache, and constipation, the tongue heavily coated and the urine highly coloured and scanty; the condition may be temporary or there may be a chronic complaint, and the author believes there is a condition of functional hepatic insufficiency with attacks of gastro-intestinal catarrh due not primarily to hepatic disorder but to digestive disorder. The treatment advised is the classic one of elimination, diet, and exercise.

A complete study of the anatomy and physiology of the portal and hepatic circulation and the signs and causes of portal hypertension precedes a most exhaustive chapter on the cirrhoses but the discussion is too detailed for summary. The opinion is expressed that in etiology alcohol is the most important of the poisons but that there is some other factor such as infection from the digestive tract which induces the overgrowth of fibrous tissue. No mention is made of the rôle of choline in hepatic physiology which has been recently reported from the Physiological Department of the University of Toronto.

On the whole, while one feels that much has been included in the attempt to cover every aspect which might have been omitted, one can heartily recommend this book for the private as well as for the public medical library.

Corrective Rhinoplastic Surgery. Joseph Safian. M.D., Attending Plastic Surgeon, Beth David and Jewish Memorial Hospitals, New York City. 218 pages, illustrated. Price $9.00. Paul B. Hoeber, New York, 1935.

There are comparatively few books in the English language dealing exclusively with the problem of correcting deformities of the nose, and the appearance of this monograph is most timely.

Dr. Safian follows in many of his operative procedures the methods of Dr. Joseph of Berlin, and his descriptive anatomy with the well illustrated diagrams makes the subsequent account of operative procedure easy to follow. The text is concise and not difficult reading, and the classification of the various deformities is simple and yet complete. The author stresses the necessity of doing the majority of the operations under local anæsthesia, but while this is ideal from the surgeon's point of view, and undoubtedly there is less risk of sepsis and post-operative pneumonia, many patients will not submit to a prolonged and trying operation under a local anæsthetic.

The book makes most interesting reading, and will be found particularly valuable to the specialist in ear, nose and throat work, and to the plastic surgeon.

BOOKS RECEIVED

The Principles of Therapeutics. F. R. Fraser, M.A., M.D., F.R.C.P., Professor of Medicine, University of London. 135 pages. Price $2.00. Abraham Flexner Lectures, No. 3. Published for Vanderbilt University by Williams & Wilkins, Baltimore, 1934.

Tuberculosis. A Book for the Patient. F. G. Holmes, M.D., Director of National Tuberculosis Association. 312 pages. Price $2.00. D. Appleton-Century Co., New York, 1935.

I Know Just the Thing for That! J. F. Montague, M.D., Medical Director New York Intestinal Sanitarium. 265 pages. John Day Co., New York, 1934.

Simple Instruction for Diabetic Patients. Dorothy C. Hare, M.D., M.R.C.P., Physician to Royal Free Hospital. Second edition, 22 pages. Price 1s. net. H. K. Lewis, London, 1935.

Health Workbook. Kathleen W. Wootten, M.A., Professor of Health, Georgia State College for Women. 212 pages. Price $1.50. A. S. Barnes & Co., New York, 1934.

Mental Hygiene and the Public Health Nurse. V. May Macdonald, R.N., Formerly Assistant Superintendent of Nurses, Johns Hopkins Hospital. Second edition, 72 pages. Price $1.50. J. B. Lippincott, Phila., London and Montreal, 1934.

The Schoolboy. G. E. Friend, M.R.C.S., L.R.C.P., Medical Officer of Christ's Hospital, Horsham. 128 pages. Price 7/6 net. W. Heffer & Sons, Ltd., Cambridge, 1935.

Diet and Like It. Mabel E. Baldwin, Ph.D. 230 pages. Price $2.50. D. Appleton-Century Co., New York and London, 1935.

Life and Soul. Max Loewenthal, M.R.C.P., London. 291 pages, illustrated. Price $2.50. George Allen & Unwin, London; Thos. Nelson & Sons, Toronto, 1935.